within remote process. 

Abstract

Contents
The laser system consists of four optical tables, each table contains a

**Figure 1**: Schematic diagram of the laser calibration setup.

**Introduction**

The software that performs the calibration sequence, we will describe the electronics to control the laser system, and then detail the pulses with varying intensity to the center of each counter. In this note, the laser system which delivers high pulse power which aligned by the laser module which contains a scatterer and particles created by the interaction of the electron beam with the laser target. In particular, the time-of-flight measurement system which consists of the laser pulse.

**Description**

The laser pulse is used to trigger the neutron detectors.
2.2 Motor Control - Filter and Mask

Shown in Figures 1 and 2, to synchronize the operation of the four lasers, a driver board of the system is a TTL controller and additional logic is required to generate DAG triggers and a delayed TTL generator, also used for the enable and disable lines. This delay is generated by a counter/mirror module and the control board. TTL signals received by the counter/mirror module and the control board in module 3 are sent to the LTL transmission module. An ECL-LTL transmission module converts these signals to the laser array (see Figures 1 and 2). A front-end processor in a WFE crate reads these signals and controls the laser module's, enabling it to control the laser array. The ECL-LTL transmission module, when connected to the WFE crate, provides feedback on the laser array's performance. If the laser array is not functioning properly, it can be powered on/off, enabled/disabled, and turned off remotely.

The laser can be powered on/off, enabled/disabled, and turned off remotely.
Figure 2. Schematic of Laser Control

VME Input/Output Module

"sc-laser1"

"camac3"

16 Channel Logic Level Translator

Power Status
Ready Status
Enable Status
Enable Trigger
Disable Trigger

South C. Shell Control Panel
Laser Box

North C. Shell Control Panel
Laser Box

Space Frame Control Panel
Laser Box

TJNAF Laser Enable/Disable Module
Quad Gate/Delay Generator

Forward Carriage
Control Panel
Laser Remote Cable

Inter Lock Cable

Power Status
Ready Status
Enable Status
Enable Trigger
Disable Trigger

Control Panel
Laser Box

South C. Shell Control Panel
Laser Box

North C. Shell Control Panel
Laser Box

Space Frame Control Panel
Laser Box

TJNAF Laser Enable/Disable Module
Quad Gate/Delay Generator

Forward Carriage
Control Panel
Laser Remote Cable

Inter Lock Cable
Figure 3: Schematic of Motor Control

- "sc-laser1"
  - Ethernet
  - MVME162 & IP-Octal card
  - RS-232
  - Extended Port

- "camac3"
  - Ethernet
  - MVME162 & IP-Octal card
  - EC
  - Laser Calibration System

- North C. Shell
  - Velmex NF90 Motor Controller
  - Mask
  - Filter

- South C. Shell
  - Velmex NF90 Motor Controller
  - Mask
  - Filter

- Space Frame
  - Velmex NF90 Motor Controller
  - Mask
  - Filter

- Forward Carriage
  - Velmex NF90 Motor Controller
  - Mask
  - Filter

Limit Switch
+ Upper
- Lower
Connection closed by foreign host.

sc-laser1 got out
value = 0x0

Escape character is \f.

Connection to sc-laser1 closed.

TCP/Port 129.57.167.207...
WEBPU3 Base Addx

Ist module on camera

program module base. Address for both VME cases are shown below.

The modules have corresponding VME bus addresses that can be changed by the user. Two VME I/O modules, the VME gate, and the VME gate, "came into the picture.

The module's base address (see Figure 7), the VME gate, is determined by
one can monitor the status of the VME gate and is written into the register
and a part of the control module. The base address is specified in the

The VME-C routines are divided into two parts: a part to control the base

3.1 C routines

failed with D commands.

The broadcast information, some DAG programs and system status is stored
in the broadcast system. Several monitoring programs can run simultaneously, along with
information. Any number of programs can receive information from the server.

A part of the VME-GUI does not need to be monitored in order to complete a call.

broadcast information through the network. The various programs
is available for broadcast and receive messages. The various programs
provide clear information for the experimenters. A server, the RT server,
should not be interfered with the failure of a monitoring program that only
information of the program is important. DAG-CG, a DAG-CG, an

controller displays the status display is also stored by the DAG program.

DAG-CG program through the network and displays information in the
operates independently. It receives messages from the DAG system and the
operates independently. It receives messages from the DAG system and the

the process of communication is displayed by a DAG-CG. This displays
and communication between the DAG and TOP asset server program

a series of procedures in the communication, the program is stored by the DAG
that initiates these X/Y/V/W commands to initiate and then check basic and
the complex problem management of the TOP-CG system is provided by DAG-CG.

This architecture allows the development of simple robust procedures
8

in different subdirectories (code, see below).

The modules mentioned above are stored
in $HOME$.

: SOURCE/\*.

: SOURCE/V\*.

: SOURCE/V\*.

: SOURCE/V\*.

: SOURCE/V\*.

: SOURCE/V\*.

for object code and

for source code.

in the header script for each VAME
compiled can be found in the sub-

: SOURCE/\*.

: SOURCE/V\*.

: SOURCE/V\*.

: SOURCE/V\*.

: SOURCE/V\*.

: SOURCE/V\*.

in VAX/VAX/WORKS.

Port communication with the motor controller relies on standard I/O

Prelude 3.

The name refers to specific locations of the RS232 extension hardware (see

module code which specifies the RS232 port names used by the VAME

well as send and receive ASCII strings. The following shows the part of the

RS232 module hierarchy which is where code can be run and choose the RS232

connections have been added to VAME. Figure 1/2 shows the RS-232 port

connections in the VAME controller via RS-232 ports. Figure 2 shows the

The program module is used to control the motors of the

Output port register:

[ 6 = adder

Input port register:

[ 6 = adder

Address base adder:

[ ed = adder

And module on sc-laser

Output port register:

[ 6 = adder

Input port register:

[ 6 = adder

Address base adder:

[ ed = adder

Let module on sc-laser

Output port register:

[ 2 = adder

Input port register:

[ 6 = adder
When conditions are met, the program stops the system through the computer.

- Must be connected to server.
- TiGer module for DAQ must be ready (bit 10 set).
- DAQ must be ready (active state).
- DAQ must be correctly configured (TOF TASTER).
- The associated drive must be ready.
- One laser must be ready.

If these conditions are met, the program will proceed. If any condition is not met, the program will stop and display an error message.

### Automatic Process: TOF LASER

```
CON~ZWMRS=/usr/local/c1as-release/1.0/zwmrs
where
modules loaded: CON~ZWMRS/code

We boot scripts: CON~ZWMRS/boot-scripts
```

---

*Note: The provided text is a screenshot of a document and contains technical details related to a system or device, possibly involving setup or configuration steps.*
additional information about use of the button.

undertaken. Each stage button on the GUI may be clicked in order to receive
sequences which are already done and the yellow hot bar means the sequence is
the start of each calibration sequence. The section "Sequence Status" displays
monitors and any diagnostic. The section "Sequence Status" displays
not that these reports are the default display in the actual motion of the
JAVAA window shows the status of each laser. The "Filter States" displays
Figure 4 shows the JAVAA window. The section "Laser States" on the
The monitoring window written in JAVAA is made to check the status of
Figure 4: monitoring JAVAA window.

3.3 Monitoring JAVAA Window

check status and turn systems off by hand.
manually stopped. There are expert programs available that can be used to
for the completion of the requested calibration, the TOF laser job must be
The experimenter would then enter the run. If hardware errors do not allow
Normal completion of the calibration will be indicated by the JAVAA GUI.
Turn off AC power and Close Gas valve

Space

Disabling Laser

Looping filter

Ready ?

South C

Disabling Laser

Looping filter

Ready ?

North C

Disabling Laser

Looping filter

Ready ?

Forward C

Disabling Laser

Looping filter

Ready ?

Check the DAQ system and VME controller

Turn on AC power and Open Gas valve
been tested and performs simply and reliably. The system has been set up to control the lasers and their mounts, and the code is designed to perform the CODA data acquisition in order to perform TOP calibrations. An automated control system has been set up to work in conjunction with the data stream, and displays status in a convenient form. The system has

Conclusion

JAVA source: /usr/local/class/dev/express/CLASS1/expr

code in the following directory. Parallel is that of the current release. The source code can be found, for example, in the structure. New versions of the code are kept in a development area. The structure and

CLASS-BIN=/usr/local/class/release/1.0/bin
/ * int id2, /* ID of motor
   / * int id1, /* ID of a laser
   )

SYNOPSIS
task send-command
()

NAME

( /* int id1, /* ID of a laser
   )

SYNOPSIS
task close-port()

NAME

RETURN

ok(0), or if an error(-1)

( /* int id1, /* ID of a laser
   )

SYNOPSIS
task open-port()

NAME

status of the laser.

Register. The value offers the information on the

DESCRIPTION

This routine checks the value of the I/O input

( /* int id, /* ID of a laser
   )

SYNOPSIS
task input()

NAME

( /* int x
   )

SYNOPSIS
task gas()

NAME

( /* int x
   )

SYNOPSIS
task part()

NAME

SOURCE/vxworks/laser

on the con machinery.

These routines are in lasers and motors. The files are located in

A Subroutine Guide
DESCRIPTION

This routine makes the filter more on the loop.

(int id /* ID of a laser */
  )

SYNOPSIS loop-filter
NAME

This routine reads the data from the Veloxex controller.

(int id /* ID of a laser */
  )

SYNOPSIS void read-filter()
NAME

Change speed of motor to the Veloxex motor controller.

This routine sends the command to move motor or

(int step /* a number of step */
  /*: mask motor speed */
  /*: filter motor speed */
  /*: mask motor */

/*: filter motor */
For the procedure the times beginning with # are ignored.

END-INIT

*16 use s-c laser/ for NC, SC, SF lasers
*15 use camera for forward carriage laser
*14 space frame laser used
*13 South charm laser used
*12 North charm laser used
*11 forward carriage laser used
*10 time in seconds between initialization sweeps
9 number of pulses (-1 = just not implemented)
8 laser frequency (not implemented)
7 sc-laser status
*6 camera status
*5 camera to wait for
*4 trigger bit
10 booted
3 configuration
*2 debug: set this to one
0 initialized
*1 note: i=com, o=off

All data to be read in must start at the first character of a line.

Entire lines must be read in the exact order as found here.

Start at the right margin and leave a white space when complete.

Only the first word or number is read per line.

Laser 4 = space frame
Laser 3 = South carriage
Laser 2 = North carriage
Laser 1 = forward carriage

Everything entered until the BEGIN-INIT is ignored.

This is the comment block.

This is the initialization and control title for laser running.
END-PROCEDURE

2
seg 4 number of loops

30
seg 4 speed

1
seg 4 filter I (only I filter available, SP)

seg 4 laser number (SP)

4

seg 3 number of loops

2
seg 3 speed

30
seg 3 filter I (only I filter available)

seg 3 laser number (SC)

3

seg 2 number of loops

2
seg 2 speed

30
seg 2 filter I (only I filter available)

seg 2 laser number (NC)

2

seg 1 number of loops

2
seg 1 speed

30
seg 1 filter I (only I filter available)

seg 1 laser number (PC)

1

1

BEGIN-PROCEDURE

Do not leave any blank lines in the lists.
References