Specifications for SLOW/FAST Controller
Intended for use with the NPRO-PSL

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LIGO-E960043-01-D

1. General

- NIM module
- All controls on front panel
- Floating BNC connectors, unless otherwise stated

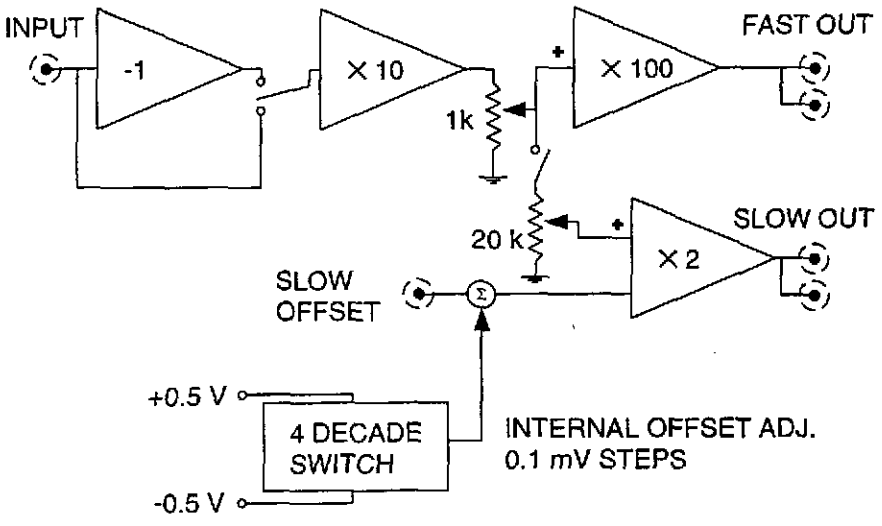

FIGURE 1. SLOW/FAST controller circuit schematic diagram.

2. Inputs

- **Signal Input**:
  - BNC connector on the front panel, labeled ***INPUT***
  - Input impedance: $Z_i \geq 1000\ \Omega$
  - Input polarity switch on front panel, labeled "+" for non-inverting and "-" for inverting.
- **Slow Path External Offset Input**:
  - BNC connector on the front panel, labeled ***SLOW OFFSET***

- **Slow Path Internal Offset**:
  - Range: ±0.5 V
  - Four-decade (0.1 mV steps) switch on front panel, labeled ***SLOW OFFSET***

3. Outputs

- **Fast output**:
  - Two BNC connectors in parallel, one on front panel, one on back panel, labeled ***FAST OUT***
  - 3 dB bandwidth (without poles and zeros specified in section 5, below): ≥ 1 MHz
  - Range: ±20 V nominal, ±24 V max.
  - Output impedance: $Z_o \leq 10\ \Omega$
  - *Input-referred noise:* ≤ 10 nV/$\sqrt{\text{Hz}}$, 100Hz ≤ f ≤ 100kHz
- **Slow output**:
  - Two BNC connectors in parallel, one on front panel, one on back panel, labeled ***SLOW OUT***
  - Range: ±4V nominal, ±6V max.
  - Output impedance: $Z_o \leq 10\ \Omega$
  - Input-referred noise: ≤ 10 nV/$\sqrt{\text{Hz}}$, 100Hz ≤ f ≤ 100kHz

4. DC Gain

- **Fast path**:
  - Overall gain 1000 ± 10%
  - First stage gain: 10 ± 10%
  - Second stage gain: 100 ± 10%
  - Gain control: 1 kΩ, ten-turn, lockable pot between first and second stage, mounted on front panel, labeled ***FAST GAIN***
- **Slow path**:
  - Overall gain 20 ± 10%
  - *First stage gain (common with fast path):* 10 ± 10%
  - Second stage gain: 2 ± 10%
  - Gain control: 20 kΩ, ten-turn, lockable pot between first and second stage, mounted on front panel, labeled ***SLOW GAIN***

5. Poles and Zeros

- **Fast path**:
  - Two poles at 500Hz ± 10%
  - One pole at 1500Hz ± 10%
  - Three zeros at 30kHz ± 10%
  - Can be distributed between first stage and second stage amplifiers

- **Slow path**:
  - Two poles at 0.025Hz ± 10%
  - Two zeros at 0.1Hz ± 10%
  - Located in second stage (x 2) amplifier