

# *Spectech*

## ST400 Scintillation Processor



## Operating Manual

April 2001

## ***Introduction***

The ST400 Scintillation Processor provides a convenient interface between a scintillation detector or photomultiplier and a multichannel or single channel analyzer. The instrument contains a high voltage supply to power the PMT, a charge sensitive preamplifier and bipolar shaping amplifier to process the signal prior to analysis.

The unit is designed to operate with either anode signals directly from the detector or positive output signals from an external scintillation preamplifier.

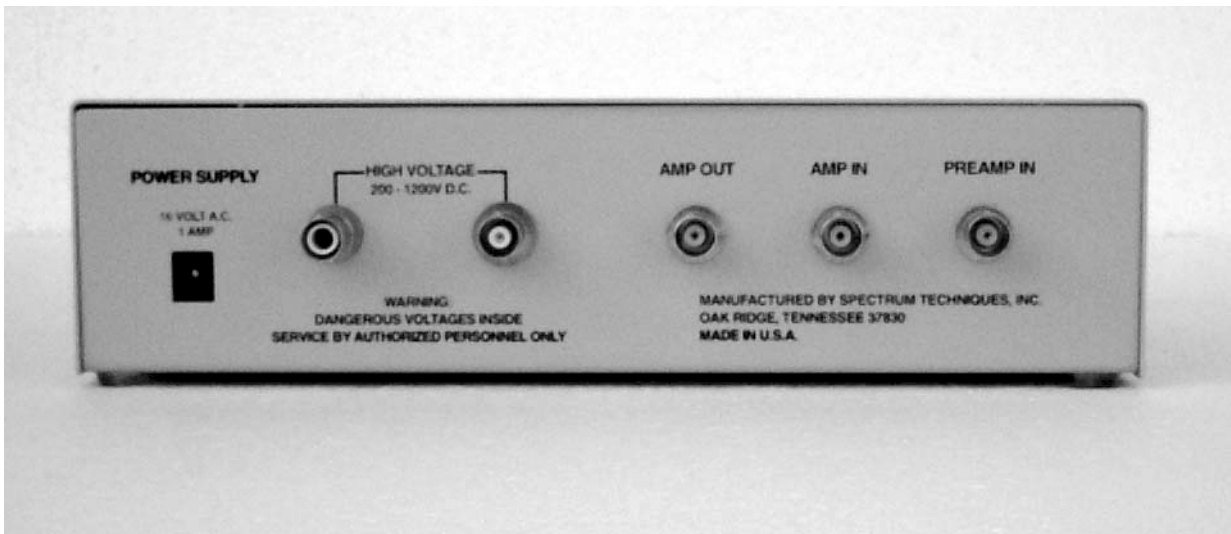
For user convenience, both MHV and SHV connectors are provided on the high voltage output for connection to most commonly available detector tube bases and preamplifiers. Only scintillation detectors and photomultipliers utilizing a **positive** high voltage supply are compatible with the ST400.

## ***Specifications***

<b>Preamp In</b>	Charge sensitive preamplifier for connection to the anode output of the detector. This input is used for detectors with a simple voltage divider type tube base producing negative anode output signals.
<b>Amp In</b>	Direct input to the shaping amplifier. Used for connecting to detectors with an external preamplifier producing positive signals.
<b>Amp Out</b>	Positive leading bipolar output from the shaping amplifier for connecting to a multichannel or single channel analyzer. 0-10 volt range set by coarse and fine gain controls, x1-x96, 1 $\mu$ sec. peaking time.
<b>High Voltage</b>	200-1200 volt <b>positive</b> supply with 1mA. maximum current capability. Fully regulated and controlled by 10-turn direct reading potentiometer. MHV and SHV connectors.
<b>Power Input</b>	16 volt AC from power module supplied.

## ***Controls and Indicators***

<b>Power</b>	Push button turns on power to unit and lights indicator.
<b>High Voltage</b>	Push button turns on high voltage and lights indicator.
<b>HV Adjust</b>	Direct reading 10-turn potentiometer sets high voltage output level, 200-1200 volts.
<b>Coarse Gain</b>	6 position rotary switch sets amplifier gain from x2 to x64.
<b>Fine Gain</b>	10-turn direct reading potentiometer sets fine gain from x0.5 to x1.5.
<b>Activity</b>	Indicates when pulses are being received and processed by the ST400.



## ***Operation***

### **Detectors with voltage divider base.**

Connect the anode (signal) output from the detector to the **Preamp In** connector.

Connect the **High Voltage** output to the detector high voltage connection using the appropriate cable.

Connect the **Amp Out** to the multichannel analyzer ADC (direct) input.

Turn on the power to the ST400, set the high voltage to the specified value for the detector and turn on the voltage.

Place a radioactive source on the detector (Cs-137) and increase the coarse gain until the **Activity** light begins flashing indicating events are being processed.

Start the multichannel analyzer in pulse height analysis mode and continue to adjust the coarse and fine gain until the desired calibration (energy range) is obtained.

If the operation voltage for the detector is not know, set the coarse gain to x8, fine gain to 1.0. turn on the high voltage and with the multichannel analyzer running, continue to increase its value until the correct calibration is obtained. Fine adjustments may now be made using the **Fine Gain** control.

### **Using an external preamplifier**

Some detector tube bases such as the Tennelec model TC155A, incorporate a built-in preamplifier which takes its power from the high voltage supply. In this instance, the output signal from the preamplifier must be connected to the **Amp In** connector on the ST400.

Other types of tube bases such as the ORTEC model 276 offer both anode and preamplifier outputs. When using this configuration, we recommend using the anode signal connected to the **Preamp In** on the ST400.

If an external preamplifier must be used, most likely it will require low voltage DC power which is not supplied from the ST400. If this power is made available, then the positive preamplifier output signal may be connected to the **Amp In** on the ST400

## ***Spectrum Techniques***

**106 Union Valley Road**

**Oak Ridge, TN 37830**

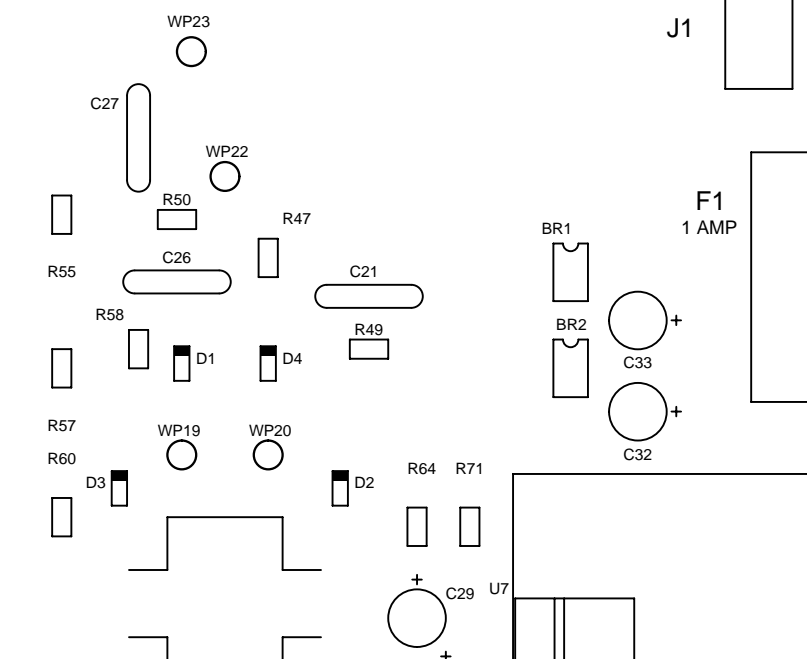
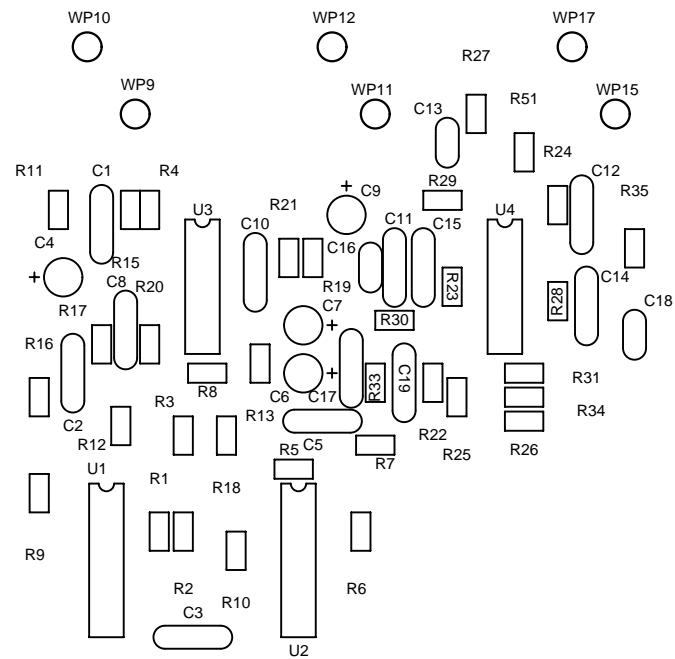
**USA**

Tel: (865) 482-9937

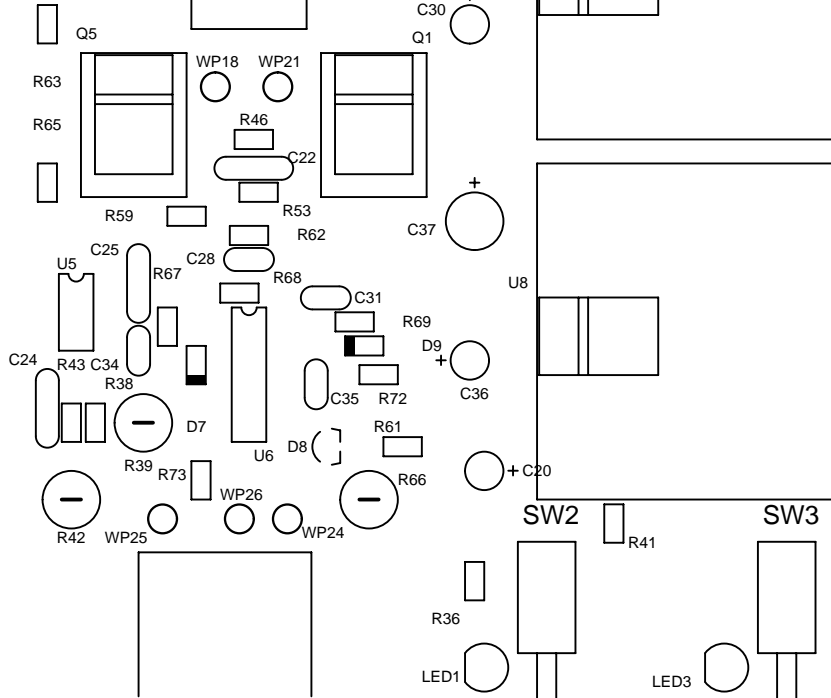
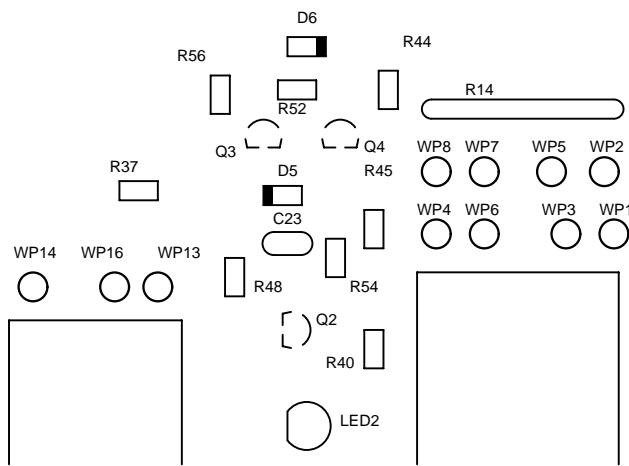
Fax: (865) 483-0473

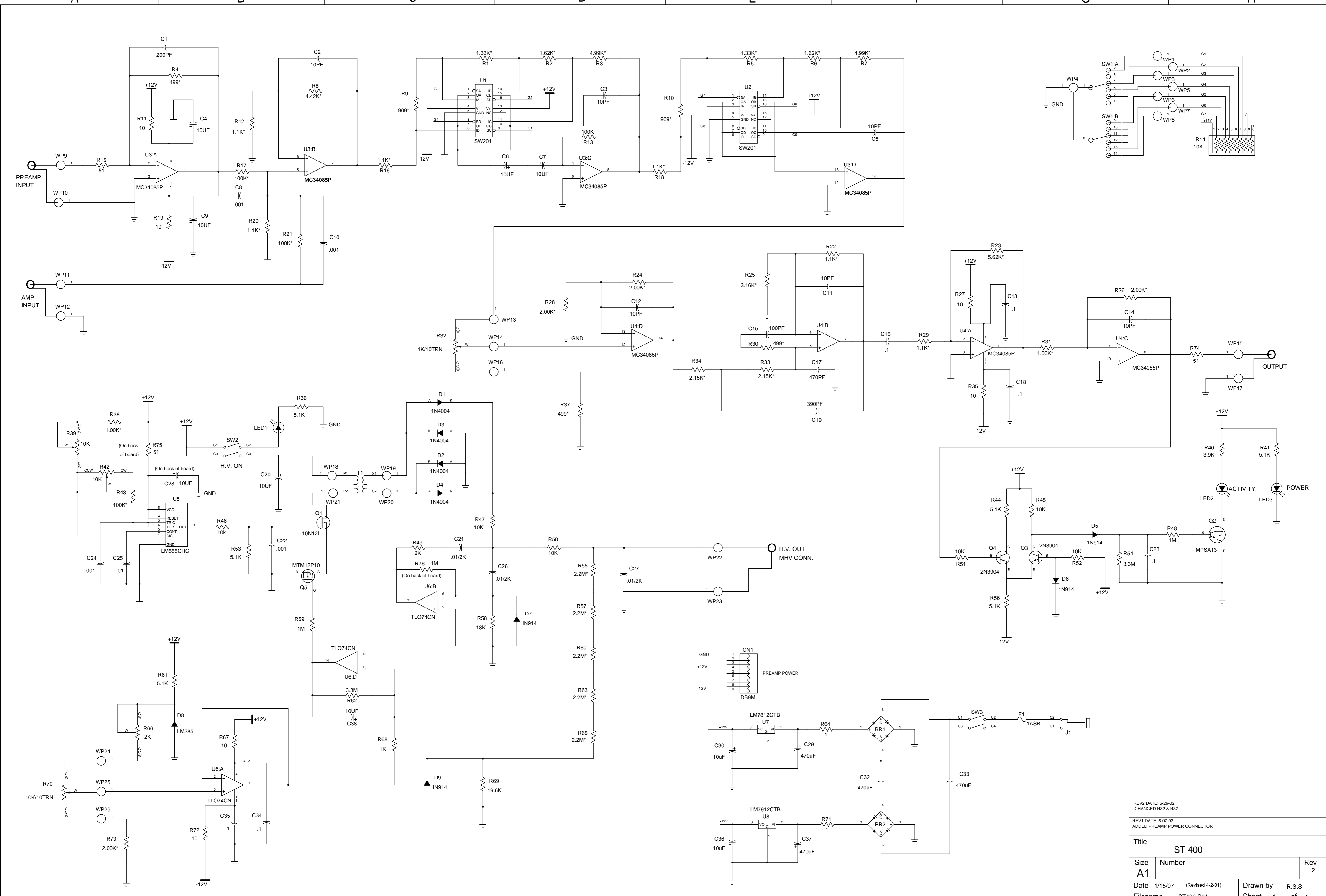
E-mail: [spectech@esper.com](mailto:spectech@esper.com)

***[www.spectrumtechniques.com](http://www.spectrumtechniques.com)***



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REV2 DATE: 6-26-02 CHANGED R32 & R37		
REV1 DATE: 6-07-02 ADDED PREAMP POWER CONNECTOR		
Title <b>ST 400</b>		
Size <b>A1</b>	Number	Rev <b>2</b>
Date 1/15/97 (Revised 4-2-01)	Drawn by <b>R.S.S</b>	
Filename <b>ST400.S01</b>	Sheet <b>1</b> of <b>1</b>	