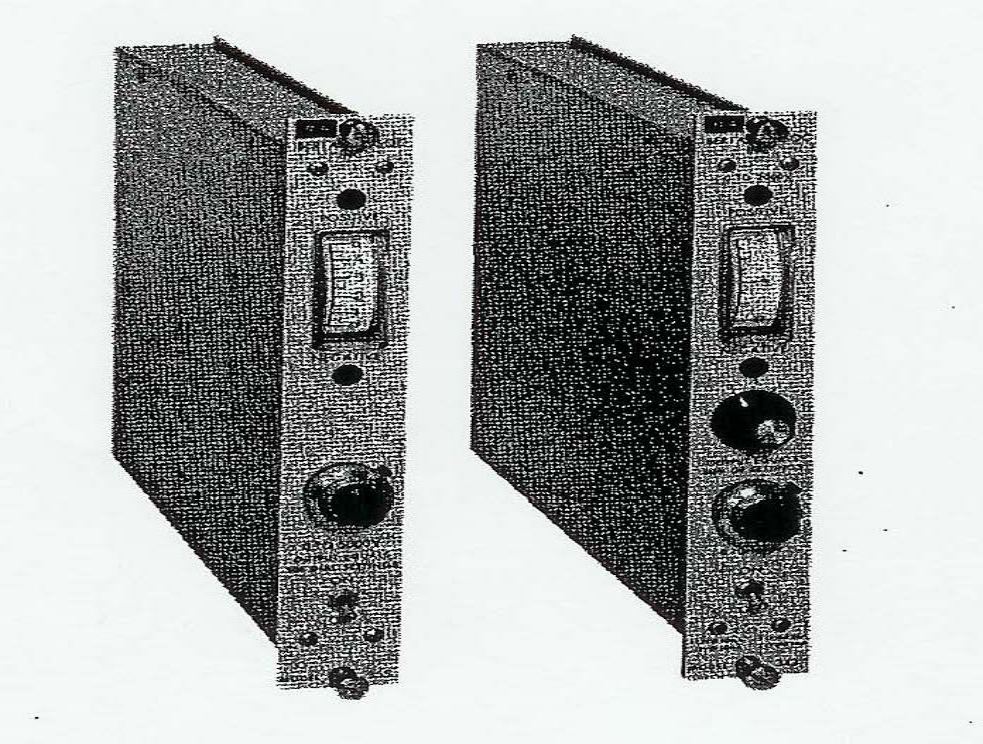
Spellman®
High Voltage Electronics Corporation



INSTRUCTION MANUAL
SINGLE WIDTH NIM MODULES
MODELS NIM 342, NIM 345, NIM 353, NIM 355

SPELLMAN HIGH VOLTAGE ELECTRONICS CORPORATION
One Commerce Park
Valhalla, New York, 10595

+1(914) 686-3600 * FAX: +1(914) 686-2870
E-mail: **sales@spellmanhv.com**
Website: **http://www.spellmanhv.com**

CAUTION: THIS UNIT PRODUCES HAZARDOUS VOLTAGE. DO NOT APPLY INPUT UNLESS ADEQUATE GROUND IS CONNECTED TO THE POWER SUPPLY AND THE HIGH VOLATGE OUTPUT HAS BEEN PROPERLY CONNECTED.

SECTION I INTRODUCTION

1.1 SCOPE OF MANUAL

1.2 This manual contains instructions for the installation, operation, and maintenance of the Spellman single width NIM High Voltage Power Supplies, Models NIM 342, NIM345, NIM 353, and NIM 355. Each model is housed in a standard AEC NIM single width module, 8.7" high x 1.35" wide, for insertion in a standard AEC NIM bin.

1.3 GENERAL

1.4 There are four Models in the single width NIM Series. The Models NIM 342 and NIM 345 utilize the +12 V dc and +24 V dc input power from the standard NIM bin connector. The Models NIM 353 and NIM 355 utilize 115/230 V ± 10%, 50-60 Hz line input power.

1.5 All the high voltage and electronic circuitry is contained on the plug- modular assembly. On Models NIM 342 and NIM 345the dc input power for this assembly is obtained directly from the chassis mounted power connector. Models NIM 353 and NIM 355 contain a chassis mounted in low voltage power supply that converts the ac line power to the dc input power for the high voltage assembly.

1.6 All single width modules are fully enclosed units. Input power, the HIGH VOLTAGE output connector, INHIBIT gate and the 115/230 line voltage selector switch are accessible at the rear panel of the unit. The ON/OFF switch, output voltage control, voltage meter and LED POLARITY indicator lights are on the front panel.

1.7 SPECIFICATIONS

MODEL	OUTPUT VOLTS	OUTPUT CURRENT	RIPPLE P-P	RESOLUTION & STABILITY	INPUT POWER
NIM 342	0 to ±2000	1 mA	2 mV	1V	±12 V dc @ 50 mA, ±24 Vdc @ 83 mA
NIM 345	0 to ±5000	0.3 mA	5 V	10 V	±12 V dc @ 50 mA, ±24 Vdc @ 83 mA
NIM 353	0 to ±3000	2 mA	5 V	1 V	115/230 V ±10%, 50 – 60 Hz
NIM 355	0 to ±5000	1 mA	10 mV	10 V	115/230 V ±10%, 50 – 60 Hz

LINE REGULATION:	0.001%
LOAD REGULATION:	0.001%
ACCURACY:	0.5% of dial reading plus 0.1% of maximum voltage.
STABILITY:	0.1%/hr, 0.02% 8hours
TEMP. CO EFFICIENT:	- C
PROTECTION:	Short circuit proof, arc protected.
CONNECTORS:	HV output-ABC type SHV connector (Mating Connector is Kings P/N 1705-1) INHIBIT Gate-BNC jack (Mating Connector is UG-260/U)
SIZE:	1.35"W x 8.7"H x 9.7"L ()34 x 221 x 246mm)
WEIGHT:	NIM 342 and NIM 345 – 3.3 lbs. (1.5 kg). NIM 353 and NIM 355 – 4.4 lbs. (2.0 kg)

SECTION II OPERATION

2.1 SCOPE OF SECTION

2.2 Section II contains the necessary information for installing and operating a single width NIM module.

2.3 INSTALLATION

2.4 All models of the single width NIM Series are intended for installation in standard AEC NIM bins. The Models NIM 353 and NIM 355 can also be operated from any 115/230 V, 50-60 Hz receptacle since they require no power from the bin.

2.5 INPUT POWER

2.6 Models NIM 353 and NIM 355 are provided with a standard three conductor ac line cord. A slide switch located on Rear panel is used to select either 115 V or 230 V line voltage operation.

DO NOT OPERATE UNTIL IT IS DETERMINED THAT THE SELECTOR SWITCH IS SET FOR PROPER LINE VOLTAGE.

2.7 Models NIM 342 and NIM 345 utilize the ±12 V dc and ± 24 V dc input power provided through the standard NIM bin power connector.

2.8 The toggle switch on the front panel is used to turn the unit ON. Either the POSITIVE or NEGATIVE LED Indicator is illuminated when the unit is under power.

2.9 POLARITY

2.10 All the units in the single width NIM Series have reversible polarity. Polarity reversal is achieved by removing the short left side panel cover on the power supply and rotating the bracket restraining the polarity selector plug. The to achieve polarity reversal. A label containing the phrase OUTPUT POSITVE or OUTPUT NEGATIVE is applicable will be visible when viewing the polarity selector plug on the side of the high voltage module. It is recommended that the OUTPUT VOLTAGE controls be set to 0 and the output polarity indicator LEDs observed for indication of the proper output polarity before the power supply is reset for high voltage.

THE MODULE MUST BE REMOVED FROM THE BIN. INPUT TURNED OFF AND THE HIGH VOLTAGE OUTPUT FULLY DISCHARGED TO GROUND AT THE OUTPUT CONNECTOR BEFORE REVERSING POLARITY.

2.11 HIGH VOLTAGE OUTPUT

2.12 An AEC type SHV high voltage output connector is located on the rear panel of the power supply.

2.13 OUTPUT VOLATGE CONTROL

2.14 On Models NIM 342 and NIM 353, the output voltage is read directly from the sum of the dial setting on the front panel. A continuous ten turn dial directly reads from 0 to 1000 V with a resolution of 1 V. A 500 V step selector switch, with up to four steps positions as appropriate is also provided on these Models. The output voltage is the sum of the switch and dial settings.

2.15 Models NIM 345 and NIM 355 employ a continuous five turn dial for output voltage control. The dial reads from 0 to 500 and output voltage is 10 times dial reading.

2.16 METER

2.17 An edge reading meter is provided for monitoring the output voltage. This meter provides a coarse indication of the output voltage. Precise output voltage settings should be derived from the calibrated voltage control dials.

2.18 REMOTE OUTPUT INHIBIT GATE

2.19 The output voltage of all single width Series NIM Modules may be remotely commanded to turn off. This function is achieved by presenting a closure to ground or a TTL compatible logic “0” through the gating INHIBIT connector J2, a BNC connector located on the rear panel . The INHIBIT gate will function at all output voltage settings. This gate can also be employed to reset an overload condition, which has caused the unit to go into automatic shutdown as described in Section 2.20.

2.20 AUTOMATIC SHUTDOWN

2.21 The unit contains automatic protection against sustained overloading. A sustained overload will cause the high voltage to shut down completely. This will be clearly indicated by the 0 output reading on the meter independent of voltage control setting. A short duration arc-over or turn-on charging transient will not cause shut down control setting. A short duration arc- over or turn- on charging transient will not cause shut down. To reset, the unit must be turned OFF for approximately 5 seconds then turned back ON. Gating the unit off via J2 (See Section 2.19) will also reset the automatic shutdown condition.

SECTION III THEORY

3.1 GENERAL

3.2 Series III describes the overall function, operation and circuitry of single width NIM voltage power supplies. This section gives background information to assist in the application and maintenance of the equipment.

3.3 FUNCTIONAL DESCRIPTION

3.4 A detailed schematic and block diagram of the single width NIM power supply is shown in Figure 1,2, and 3. The high voltage module is basically a dc-dc converter, which converts low voltage dc power to high voltage dc output. This output voltage is highly regulated and filtered and can be varied by the front panel voltage controls.

3.5 The input to the high voltage dc-dc converter module is obtained from a conventional low voltage power supply with ac line input in Models NIM 353 and NIM 355. A schematic diagram for the low voltage power supply with ac line input is contained in the functional block diagram Figure 2. In Models NIM 342 and NIM 345, the input to the dc-dc converter is obtained from the $\pm$ 12 V dc and $\pm$24 V dc in the NIM bin.

3.6 An oscillator determines the high frequency (approximately 20 kHz) at which all amplification, high voltage transformation, rectification and filtering occurs. The amplification is a function of control and regulation. A sample of the output voltage is compared with a reference voltage in the sensing circuit. The sensing circuit generates the control voltage to set and maintain a fixed high voltage.

SECTION IV MAINTENANCE

4.1 GENERAL

4.2 Section IV contains information required for the test and maintenance of a single width NIM power supply. It is organized around the test procedure used to determine that the equipment is operating to specifications.

4.3 TEST EQUIPEMENT REQUIRED

4.4
a. Oscilloscope
b. Digital voltmeter
c. Variable autotransformer (required for Models 353 and 355 only)
d. High impedance, high voltage, 100:1 precision dc voltage divider
e. Capacitive coupled ac viewing circuit
f. High voltage load resistor rated for maximum voltage and current of Model tested.

4.5 PREPARATION FOR MEASUREMENTS

4.6 Connect the high voltage output of the power supply to the high voltage terminal of the dc voltage divider and to the capacitor input of the ac viewing circuit. The low voltage terminal of the dc divider should be connected to the digital voltmeter input, and the ac viewing output connected to the oscilloscope input. Make sure that a good ground is connected to all instruments, viewing circuits and the power supply before applying input power. For Models NIM 353 and NIM 355 the ac input should be applied through the variable autotransformer, which should be initially set for 115 or 230 volts output, as appropriate.

4.7 PERFORMANCE TEST

4.8 Check to assure that the procedures in Section 4.6 above have been followed.

Turn the front panel output voltage controls to maximum output. The digital voltmeter should indicate the maximum rated output of the unit.

Connect one end of the high voltage load resistor to ground and the other end to the shorting stick. Then, with the shorting stick, connect the load resistor across the HIGH VOLTAGE OUTPUT and observe the change in output voltage. During this no load to full load test, the digital voltmeter should not change by more than 0.000%.

With the load connected as above, observe the ac ripple voltage on the oscilloscope. The ripple should be less than the specified peak-to-peak ripple under this condition of full load and maximum voltage.

For the Models NIM 353 and NIM 355, vary the autotransformer to produce an ac line input change of ±10% to the power supply and again observe the change in digital voltmeter reading. This change should be less than 0.001%

Additional line and load regulation and ripple measurements may be performed at other voltage levels using the same procedure outlined above. This should not usually be necessary. Satisfactory test data at maximum output voltage and full range voltage control generally indicate that satisfactory teat data will be obtained at all voltage levels. However, full range testing is performed at the factory on each unit prior to shipment.

4.9 TROUBLE-SHOOTING PROCEDURE

4.10 Prior to trouble shooting a unit, the following should be checked. Proper input must be applied. The polarity connector must be attached (See Section 2.9). Make sure that the output is not being overloaded and that any overload condition causing automatic shutdown has been properly reset (See Section 2.20).

4.11 The power supply consists of two (Models NIM 342 and NIM 345) or three (Models NIM 353 and NIM 355) easily replaceable assemblies and a main chassis assembly. The basic trouble-shooting procedure consists of determining which of these assemblies is defective. Removal of the two side cover provides access to all assemblies.

No further disassembly is required for trouble-shooting purposes. ONCE THE COVER HAS BEEN REMOVED, EXTREME CAUTION MUST BE EXERCISED AS POTENTIALLY DANGEROUS VOLTAGE ARE ACESSIBLE. Make sure all test instruments are grounded, either to the high voltage connector shield or directly to the chassis, prior to the application of the input power to the unit. The following procedures should then be followed.

4.12 For ac input units, remove the plug in control module from its socket after removing the screws that hold it to the chassis. This leaves only the ±15 V dc power supply operable. Apply input power and measure these voltages on the power supply board. If the voltages differ from ± 15 V dc by more than 5% , this board is probably defective.

For dc inputs units, determine that the ±12 V dc and ±24 V dc obtained from the NIM bin are operating properly.

If all the low voltage power supplies are operating properly and no high voltage output is obtainable, either the control module or the high voltage is probably defective. To determine which unit is defective, test for ac drive to the base of drive transistors Q101 and Q102 on the control module. If drive is present, the encapsulated high voltage module or transistors Q101 and/or Q102 is probably defective. If there is no drive even when the voltage control is raise, then the fault is probably in the control module.

The ac power supply board and the plug-in control module can be repaired in the field or returned to the factory for repair or replacement. It is recommended that the entire unit be returned to the factory for repair of the encapsulated high voltage module.

After insulation of a new control or high voltage module, it is necessary to readjust the oscillator frequency control, R103, located on the control module. Set the unit for maximum voltage and no load and, observing the waveform at the emitter of Q101 or Q102, adjust R103 for minimum emitter waveform.

4.13 Spare assemblies, switches, connectors, voltage controls, meters, etc. can be obtained from the factory. When ordering, specify the Model number, serial number, and schematic diagram reference number to assure direct replace ability with the original assemblies.

SECTION V SPARES

5.0 Operational spares to support The Single Width NIM Modules are available from the factory. It is recommended that the common electric components: i.e., resistors, capacitors, transistors, etc. be purchased from local electronics distributors. The values and descriptions of these components are indicated in figures 1, 2, 3, and 4. Specialized –Spellman- parts may be ordered directly from the factory and are indicated in the spare parts list below. Indicate the model number and serial number when ordering spare parts.

5.1 PARTS LIST – MODEL 342, 345, 353, and 355

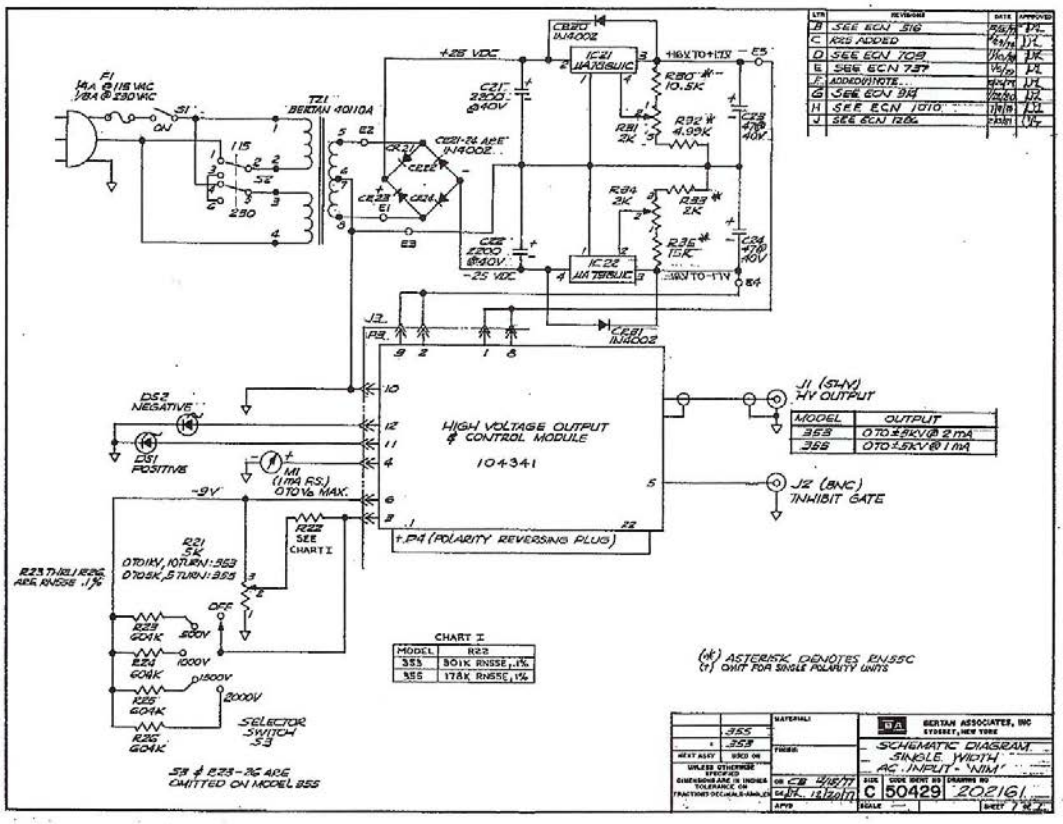
- SPELLMAN – P/N

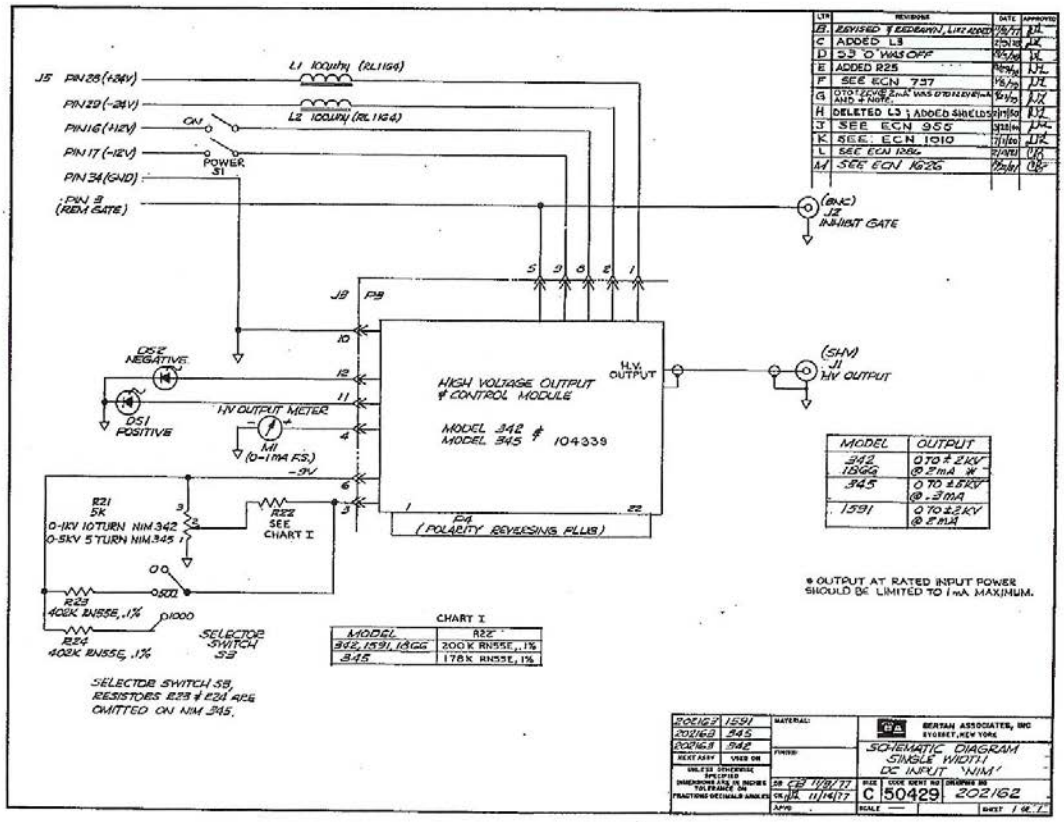
Description	Model 342	345	353	355
HV ASSY (including mounting plate, polarity Reversal connector	203258	203258-1	203258-4	203258-2
High Voltage Connector J1	1707-1	1707-1	1707-1	1707-1
J1 Mating Connector	1705-1	1705-1	1705-1	1705-1
Inhibit Gate Connector J2	UG290A/U	UG290A/U	UG290A/U	UG290A/U
J2 Mating Connector	UG-88C/U	UG-88C/U	UG-88C/U	UG-88C/U
Control Circuit Board PCB 100	204352-1	204352-2	204347-1	204347-2
Panel Meter M1	---	202142-1	204142-2	202142-1
Power Transformer T21	---	---	40110	40110
Input filter chokes L1-L2	LB100	LB100	---	---

WARRANTY

Spellman High Voltage warrants this instrument to be free from defects in material and workmanship for a period of one year from the date of shipment. This warranty does not apply to equipment that has been subjected to misuse or which has been repaired or altered in any way by the user. Spellman High Voltage is responsible only for the cost of materials and labor to repair or replace, FOB our factory, products proved to be defective during the warranty period. We are not liable for consequential damages incurred due to failure of this equipment. No other warranty is expressed or implied. All products returned under warranty must be shipped prepaid to the factory with documentation describing the malfunction noted. It is recommended that the factory be notified and a Return Authorization Number be obtained prior to shipment. The equipment will be evaluated, then repaired or replaced and promptly returned if the warranty claims are substantiated. A nominal service charge will be made for any unsubstantiated claims. Include the Spellman High Voltage model and serial number in all correspondence with the factory.

"MANUAL MAY NOT REFLECT LATEST REVISIONS"


HIGH VOLTAGE OUTPUT & CONTROL MODULE
104341
J1 (SHV) HV OUTPUT
J2 (BNC) INHIBIT GATE
P4 (POLARITY REVERSING PLUG)
DS2 NEGATIVE
DS1 POSITIVE
M1 (1mA FS.) 0TO½ MAX.
-9V
R21 5K 0TO1KV, 10TURN: 343 0TO5K, 5 TURN: 355
R22 SEE CHART I
R23 THRU R26 ARE RN55E .1%
R23 604K 500V
R24 604K 1000V
R25 604K 1500V
R26 604K 2000V
SELECTOR SWITCH S3
S3 & R23-26 ARE OMITTED ON MODEL 355
CHART I
MODEL | R22
355 | 301K RN55E, .1%
355 | 178K RN55E, 1%
(*) ASTERISK DENOTES RN55C
(†) OMIT FOR A SINGLE POLARITY UNITS
SCHEMATIC DIAGRAM SINGLE WIDTH AC INPUT - 'NIM'
SIZE C 50429 202161


J5 PIN 28 (+24V)
PIN 29 (-24V)
PIN 16 (+12V)
PIN 17 (-12V)
PIN 34 (GND)
PIN 3 (REM GATE)
L1 100μH (RL1164)
L2 100μH (RL1164)
ON POWER S1
(BNC) J2 INHIBIT GATE
HIGH VOLTAGE OUTPUT & CONTROL MODULE
MODEL 342 & MODEL 345 104339
H.V. OUTPUT
(SHV) J1 HV OUTPUT
DS2 NEGATIVE
DS1 POSITIVE
HV OUTPUT METER M1 (0-1mA F.S.)
-9V
R21 5k 0-1KV 10TURN NIM 342 0-5KV 5 TURN NIM 345
R22 SEE CHART I
R23 402K RN55E, .1%
R24 402K RN55E, .1%
SELECTOR SWITCH S3
P4 (POLARITY REVERSING PLUG)
MODEL | OUTPUT
342, 1591, 1866 | 0TO ± 2KV @ 2mA *
345 | 0 TO 2.5KV @ .3mA
1591 | 0TO ±2KV @ 2mA
* OUTPUT AT RATED INPUT POWER SHOULD BE LIMITED TO 1mA MAXIMUM.
CHART I
MODEL | R22
342, 1591, 1866 | 200K RN55E, 1%
345 | 178K RN55E, 1%
SELECTOR SWITCH S3, RESISTORS R23 & R24 ARE OMITTED ON NIM 345.
SCHEMATIC DIAGRAM SINGLE WIDTH DC INPUT 'NIM'
SIZE C 50429 202162

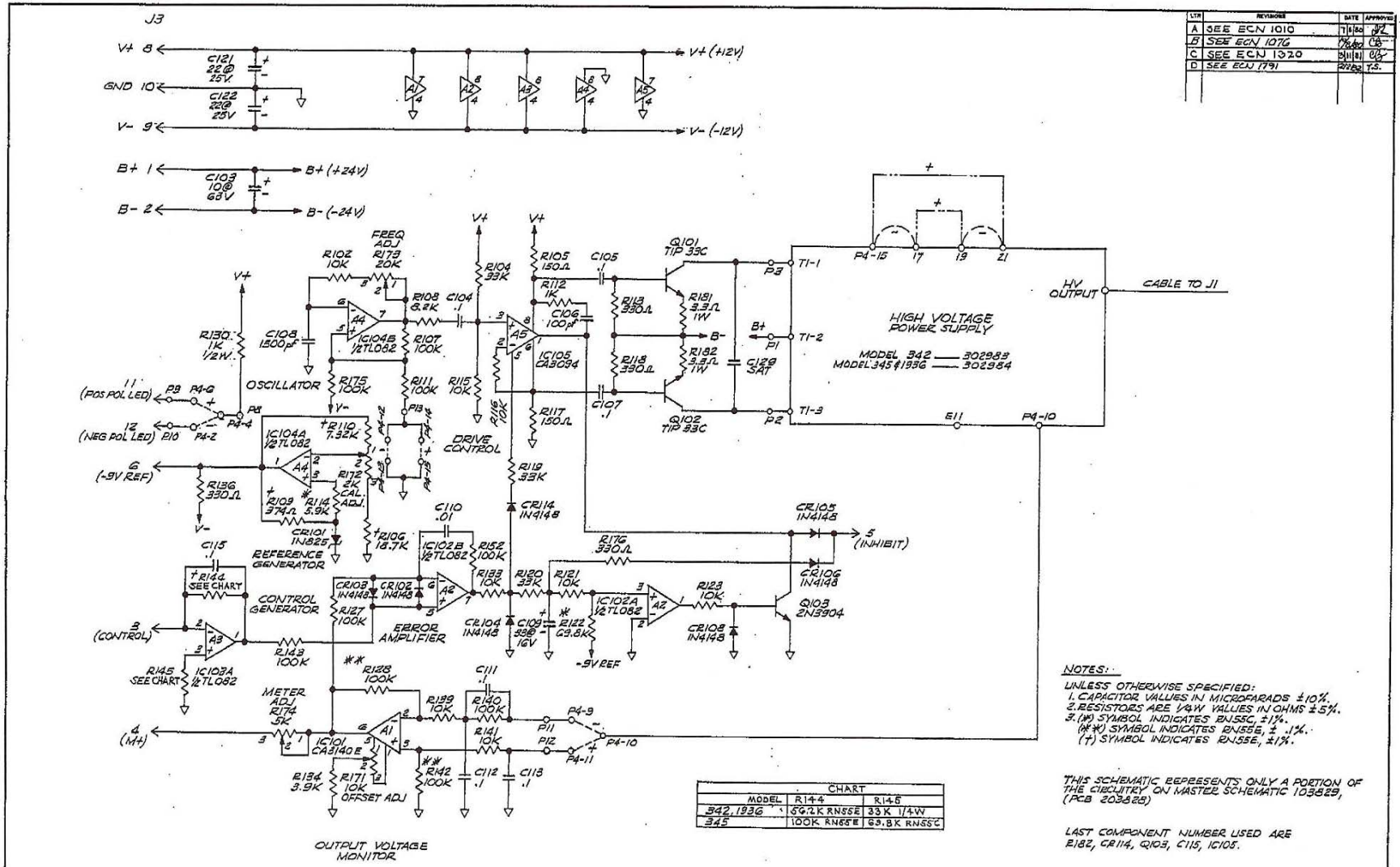


CHART		
MODEL	R144	R145
342, 1936	69.2K RN55E	33K 1/4W
345	100K RN65E	63.8K RN55C

NOTES:

UNLESS OTHERWISE SPECIFIED:
1. CAPACITOR VALUES IN MICROFARADS ±10%.
2. RESISTORS ARE 1/4W VALUES IN OHMS ±5%.
3. (##) SYMBOL INDICATES RN55C, ±1%.
   (**) SYMBOL INDICATES RN55E, ± .1%.
   (†) SYMBOL INDICATES RN55E, ±1%.

THIS SCHEMATIC REPRESENTS ONLY A PORTION OF THE CIRCUITRY ON MASTER SCHEMATIC 103829, (PCB 203825)

LAST COMPONENT NUMBER USED ARE R182, CR114, Q103, C115, IC105.

LTR	REVISIONS	DATE	APPROVED
A	SEE ECN 1010	7/6/80	[illegible]
B	SEE ECN 1076	[illegible]	CB
C	SEE ECN 1320	3/11/81	CB
D	SEE ECN 1791	2/22/82	T.S.

1936	
345	
342	
NEXT ASSY	USED ON

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE ON FRACTIONS DECIMALS ANGLES

MATERIAL:

FINISH:

DR CB 3/6/80

CK

APVD

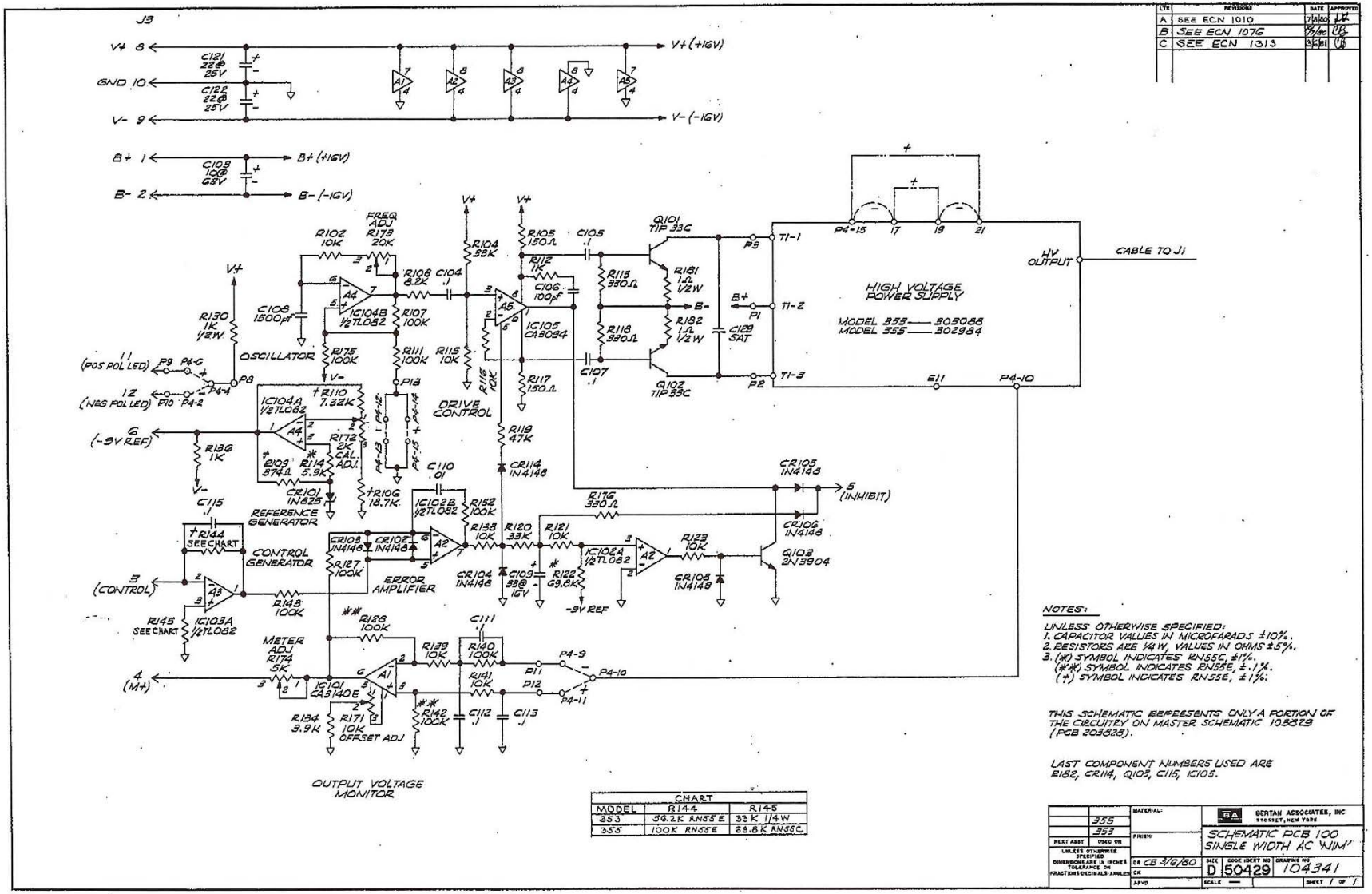
BERTAN ASSOCIATES, INC SYOSSET, NEW YORK

SCHEMATIC PCB 100 SINGLE WIDTH DC 'VIM'

SIZE D | CODE IDENT NO 50429 | DRAWING NO 104339

SCALE —

SHEET 1 OF 1



LTR	REVISIONS	DATE	APPROVED
A	SEE ECN 1010	7/6/00	LK
B	SEE ECN 1076	9/1/00	LK
C	SEE ECN 1313	3/6/81	LK

CHART		
MODEL	R144	R145
353	36.2K RN55E	33K 1/4W
355	100K RN55E	69.8K RN55C

NOTES:

UNLESS OTHERWISE SPECIFIED:
1. CAPACITOR VALUES IN MICROFARADS ±10%.
2. RESISTORS ARE 1/4 W, VALUES IN OHMS ±5%.
3. (M) SYMBOL INDICATES RN55C, ±1%.
   (**) SYMBOL INDICATES RN55E, ±.1%.
   (†) SYMBOL INDICATES RN55E, ±1%.

THIS SCHEMATIC REPRESENTS ONLY A PORTION OF THE CIRCUITRY ON MASTER SCHEMATIC 103329 (PCB 203328).

LAST COMPONENT NUMBERS USED ARE R182, CR114, Q103, C115, IC105.

	355	MATERIAL:	BERTAN ASSOCIATES, INC SYOSSET, NEW YORK
	353	FINISH:	SCHEMATIC PCB 100 SINGLE WIDTH AC 'WIM'
NEXT ASSY	USED ON	DR CB 3/6/80	SIZE D / CODE IDENT NO 50429 / DRAWING NO 104341
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE ON FRACTIONS DECIMALS ANGLES		CK	
		APVD	SCALE — / SHEET 1 OF 1

Spellman High Voltage

ADDENDA
SINGLE WIDTH NIM MODULE
INSTRUCTION MANUAL 3/1/82

NOTE: **This addenda covers the updated models 342 & 345 which are now designated models 342A & 345A0**

PARAGRAPH 2.19: **Omit the following line:**
"This gate can also be employed to reset an overload condition which has caused the until to go into automatic shutdown as described in Section 2.20"

SECTION 2.20: **Now reads as follows:**
CURRENT LIMIT

PARAGRAGH 2.21: **Now reads as follows:**
The unit contains automatic protection against overloading. An overload condition will cause the output to be limited to a safe level. The output voltage will automatically recover upon the removal of an excessive current load.

SPELLMAN HIGH VOLTAGE ELECTRONICS CORPORATION
One Commerce Park
Valhalla, New York, 10595
+1(914) 686-3600 * FAX: +1(914) 686-2870
E-mail: **sales@spellmanhv.com**
Website: **http://www.spellmanhv.com**

INSTALLAION

AND

OPERATING

INSTRUCTION MANUAL

MODELS

362 365 362/5

WARNING

THIS UNIT CONTROLS HAZARDOUS VOLTAGES. DO NOT APPLY
INPUT POWER UNLESS ADEQUATE GROUNDING IS PROVIDED
TO THE POWER SUPPLY AND THE HIGH VOLTAGE
OUTPUT HAS BEEN PROPERLY CONNECTED.

WARRANTY

Spellman High Voltage warrants this instrument to be free from defects in material and workmanship for a period of one year from the date of shipment. This warranty does not apply to equipment that has been subjected to misuse or which has been repaired or altered in any way by the user. Spellman High Voltage is responsible only for the cost of materials and labor to repair or replace, FOB our factory, products proved to be defective during the warranty period. We are not liable for consequential damages incurred due to failure of this equipment. No other warranty is expressed or implied. All products returned under warranty must be shipped prepaid to the factory with documentation describing the malfunction noted. It is recommended that the factory be notified and a Return Authorization Number be obtained prior to shipment. The equipment will be evaluated, then repaired or replaced and promptly returned if the warranty claims are found to be substantiated. A nominal service charge will be made for any unsubstantiated claims. Included the Spellman High Voltage Model and Serial number in all correspondence with the factory.

Spellman High Voltage Electronics Corporation
One Commerce Park, Valhalla, NY 10595
Phone: (914) 686-3600 Fax: (914) 686-2870
E-mail: sales@spellmanhv.com
Website: http://www.spellmanhv.com

SECTION I GENERAL DESCRIPTION

1.1 PURPOSE OF EQUIPMENT

The Spellman NIM Modules are precision high voltage power supplies, designed for use in sensitive nuclear detectors.

1.2 DESCRIPTION

Each model is available with two identical high voltage outputs or one with 2kV and one 5kV output. The polarity of each of the outputs is independently reversible by means of a polarity module located inside the unit. Polarity for each output is indicated by front panel mounted LED's.

The Model 362 is adjustable from 0 to 2kV each output, the Model 365 from 0 to 5kV each output and the Model 362/5 from 0 to 2kV (output A) and 0 to 5kV (output B) The models feature accurate, independent inhibit gate for each of the outputs.

1.3 ELECTRICAL SPECIFICATIONS

Input Power:	±12Vdc @ 60mA, ±24Vdc @ 160 mA from NIM BIN power supply.		
Output Power:	Model 362	– 0 to 2kV @ 1mA	(both outputs)
	Model 365	– 0 to 5kV @ 300uA	(both outputs)
	Model 362/5	– 0 to 2kV @ 1mA	(output A)
		- 0 to 5kV @ 300uA	(output B)
Control:	Two multi-turn precision potentiometer and counter dial assemblies allow independent accurate control of each output.		
Accuracy:	0.025 of setting plus 0.05% of maximum voltage plus resolution.		
Resolution:	The maximum voltage control error due to control resolution and reset ability is 10V for both 2kV and 5kV outputs.		
Programming:	Two rear panel switches independently select local or remote programming mode for each output. Programming is accomplished by applying independent 0 to –5V inputs to the rear panel control connector for 0 to maximum output. Program input impedance is 2 megohms minimum.		
Inhibit Gate:	A closure to ground or open collector transistor logic capable of sinking 4mA of current and with VCE SAT <. 7V will turn off the high voltage. A pull-up resistor (47 kΩ) connected internally to +12V allows the unit to turn on without any connection to the inhibit gate. A logic "1" (voltage >6.0V) will also turn the high voltage on.		

Load Regulation: 0.002% for a NL-FL or FL-NL change.

Line Regulation: 0.001% for a ± 1% change.

Ripple: 0.0001% peak – to – peak max.

Temp Coeff: 50ppm/°C over the range of 0 to +50°C

Stability: .01%/hour; .02%/8 hours after initial warm-up.

Meters: Two independent meters located on the front panel provide a coarse indication of each output voltage. Precise output voltage settings should be derived from the calibrated voltage control dials.

Output Polarity: Independent polarity reversal of each output is achieved by an internal polarity reversal module. The polarity for each output is indicated by front panel LED's which illuminate when input power is applied.

Protection: Short circuit and arc protected, and current limiting.

1.4 MECHANICAL SPECIFICATIONS

Size: Single width standard NIM module.
1.35"W x 8.7"H x 9.7"L (34 x 221 x 246mm).

Weight: 4 pounds (1.8kg)

Input Connector: Winchester 111208-53. (AEC NIM standard connector)

HV Connector: Two SHV panel receptacles (Kings 1707-1). Mating connector (order separately) is SHV plug Kings 1705-1

LV Connector: Remote Program & Inhibit Input (Winchester M9S-LRN). Mating connector (order separately) is Winchester M9P-LSH19C.

REMOTE CONTROL PIN DESIGNATIONS			
PIN	FUNCTION	PIN	FUNCTION
A	INHIBIT 'A'	F	GND 'B'
B	REF 'A' (-5Vdc)	H	PROGRAM 'B'
C	PROGRAM 'A'	J	REF 'B' (-5Vdc)
D	GND 'A'	K	INHIBIT 'B'
E	N.C.		

SECTION II INSTALLATION

2.1 INSTALLATION

This Series of single width NIM units are regulated, dual output, high voltage power supplies that conforms to AEC Standards for insertion into NIM bin. Each unit is a single width module, secured into the NIM by means of captive front panel screws. Input power is obtained from the bin dc power via the rear panel Winchester 111-20853 connector.

All of the units in the single width NIM Series have reversible polarity. Polarity reversal is achieved by removing the right side panel cover on the power supply. The polarity selector plug can then be rotated by 180° to achieve polarity reversal. A label containing the phrase OUTPUT POSITIVE or OUTPUT NEGATIVE as applicable will be visible when viewing the polarity selector plug on the high voltage module. It is recommended that the OUTPUT VOLTAGE controls be set to zero (0) and the output polarity indicator LED's observed for indication of the proper output polarity before the power supply is reset for high voltage.

THE MODULE MUST BE REMOVED FROM THE BIN. INPUT TURNED OFF AND THE HIGH VOLTAGE OUTPUT FULLY DISCHARGED TO GROUND AT THE OUTPUT CONNETCOR BEFORE REVERSING THE POLARITY.

Set the LOCAL/REMOTE switch on the rear panel to LOCAL if front panel control is desired. If remote control operation is required, set the switches to REMOTE, and connect the programming signal input at the rear panel to the remote program connector. The high voltage power supply is turned on.

SECTION III OPERATION

3.1 OPERATION

The operation of the power supplies is controlled and monitored by the meter, switches, indicators, and connectors located on the front and rear panels. Remote and local control operation can be selected and the operation fully monitored for each of the two independent outputs.

The models feature accurate and remote output voltage control. The units are short circuit and arc protected along with a current limit circuit. The output voltage will automatically recover upon removal of the overload condition.

3.2 FRONT PANEL CONTROLS, METERS, AND INDICATORS

3.2.1 PANEL METER

The two independent front panel meters monitor the output voltages of either of the two high voltage power supplies. This meter provides a coarse indication of the output voltage. Precise output voltage settings should be derived from the calibrated voltage control dials.

3.2.2 ON/OFF SWITCHES

The two toggle switches provide independent ON/OFF control of each power supply.

3.2.3 POLARITY INDICATORS

Either of the two (or both) toggle switches on the front panel is used to turn the unit ON. Either on the POSITIVE or NEGATIVE LED indicator will illuminate when the unit(s) are under power; indicating the polarity out the output voltage.

3.2.4 HIGH VOLTAGE CONTROL

Two independent multi-turn potentiometers and calibrated dials set the output voltage for A and B power supplies in the local operating mode.

3.3 REAR PANEL SWITCHES AND CONNECTORS

The back panel contains the input power, the high voltage output connectors, Remote Input/Inhibit Gate and the REMOTE/LOCAL selector switches for each power supply.

3.3.1 HIGH VOLTAGE OUTPUT CONNECTORS

The high voltage output connectors, one each of the two independent high voltage power supplies, are located at the top of the rear panel. See Section 1.4 for the appropriate output connector and mating connector part numbers.

3.3.2 REMOTE/LOCAL SWITCHES

The two toggle switches independently select remote or local mode of operation for the A and B power supplies.

3.3.3 REMOTE INPUT CONNECTOR/INHIBIT GATE

A multi-pin connector (Winchester M9S-LRN) is provided for Remote Control/Inhibit inputs. See section 1.4 for the appropriate mating connector and the function of each pin.

3.3.4 INPUT POWER CONNECTOR

A standard NIM bin connector provides power to unit from the NIM bin gate. The connector is Winchester 111-20853.

SECTION IV THEORY OF OPERATION

4.1 GENERAL

The units consist of two high voltage power supply modules. The Schematic Block Diagram (DWG. 206579) clearly shows the interconnections and functions of all major assemblies and circuits. The additional schematic is for the high voltage control PC Board (DWG. 106478).

4.2 FUNCTIONAL DESCRIPTION

The high voltage module is basically a DC_DC converter which converts low voltage DC power to a highly regulated and filtered, and can be varied. The dc input to the converter is obtained from the low voltage power supplies in the NIM bin.

An oscillator in the module determines the high frequency (approximately 35kHz) at which all amplification, high voltage transformation, rectification and filtering occurs.

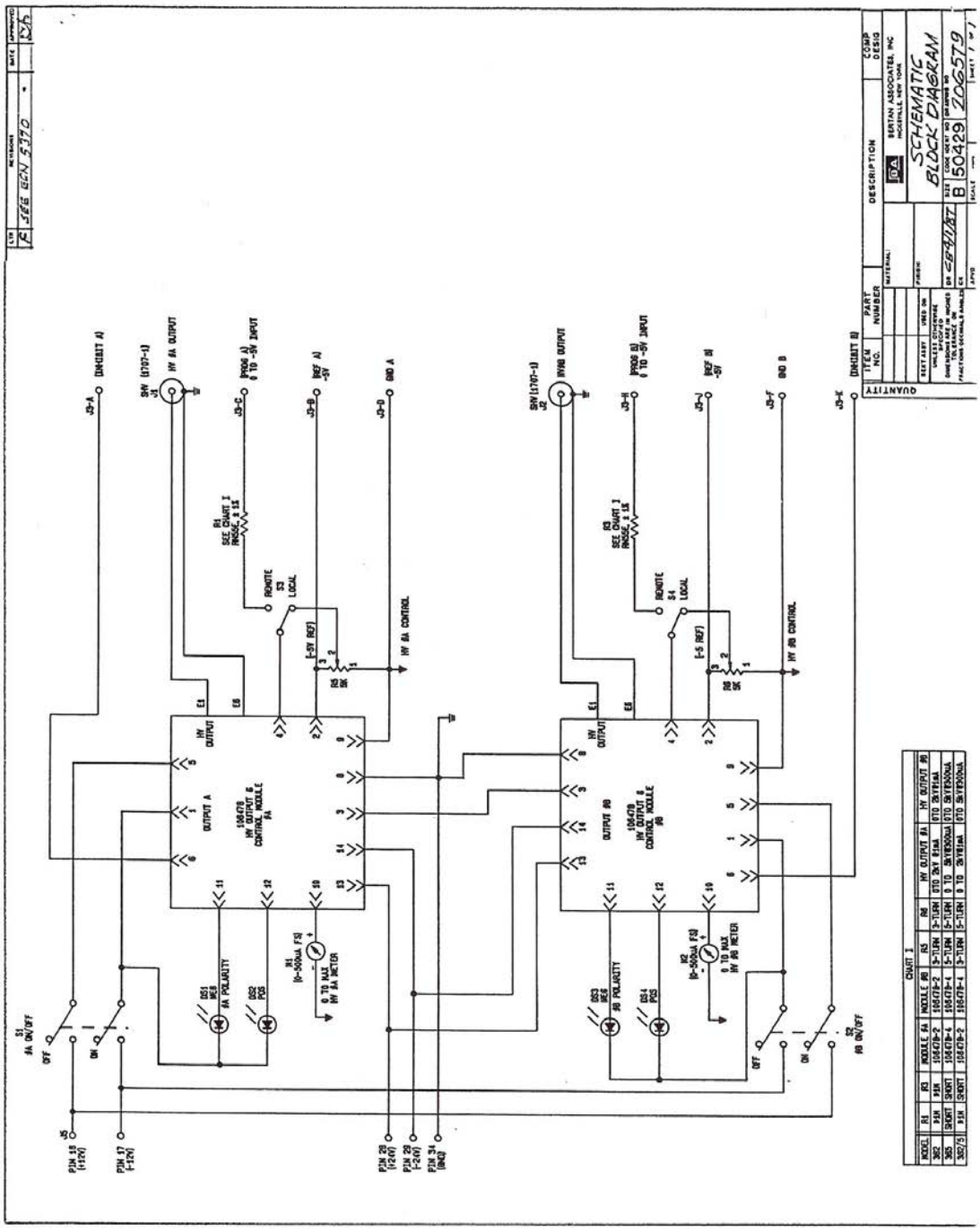
The amplification is controlled by a circuit, which performs the function of control and regulation. A sample of the output high voltage is compared to a reference voltage in the sensing circuit. The sensing circuit generates the control voltage to set and maintain a fixed high voltage output. Output current is sensed, and over current conditions cause the unit to limit the output current to a safe level until the overload is removed.

SECTION V SERVICE AND REPAIR

5.1 GENERAL

The high voltage power supply should not require any maintenance or calibration. It is designed for reliable, trouble free operation. If any question should arise, contact Spellman's Customer Service Department for assistance or return authorization. Although adequate information is provided in the schematics included with this manual and in Section 4, it is suggested that the unit be returned to the factory if service should become necessary.

890301


SCHEMATIC
BLOCK DIAGRAM
206579
B
50429
BERTAN ASSOCIATES, INC
HICKSVILLE, NEW YORK
DESCRIPTION
PART NUMBER
ITEM NO.
QUANTITY
CONNECT A)
CONNECT B)
HV #A OUTPUT
HV #B OUTPUT
PROG A) 0 TO -5V INPUT
PROG B) 0 TO -5V INPUT
REF A) -5V
REF B) -5V
GND A
GND B
HV #A CONTROL
HV #B CONTROL
REMOTE
LOCAL
S1 #A ON/OFF
S2 #B ON/OFF
DS1 #A POLARITY
DS2 #A POS
DS3 #B POLARITY
DS4 #B POS
M1 0-500uA FS
M2 0-500uA FS
0 TO MAX HV #A METER
0 TO MAX HV #B METER
PIN 18 (+12V)
PIN 17 (-12V)
PIN 28 (+24V)
PIN 29 (-24V)
PIN 34 (GND)
CHART 1