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Ge Series Six 6
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In Stock! Axis Positioning Module Type 2 (Encoder Feedback)
IC600Y IC600YB

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TABLE 1. FEATURES AND BENEFITS (Continued)

FEATURES	BENEFITS
Digital speed regulation Diagnostics Base Speed command	No steady state velocity error. Reports command, control and drive system errors to reduce downtime and improve start ups. Permits instantaneous change of commanded velocity.

MODULE SPECIFICATION	
Space Requirements:	One Series Six I/O slot in either a Model 60 CPU rack or a High-Capacity I/O rack. A Standard I/O Rack cannot be used.
Power Requirements:	+5 V dc @ 1.25 amp maximum. + 12 V dc @ 265 mA maximum. -12 V dc @ 155 mA maximum. Approximately 38 UNIT LOADS
	A maximum of three (3) APM II modules may be installed in a Model 60 CPU rack. A maximum of six (6) APM II modules may be installed in a High Capacity I/O rack.
Storage Temperature:	0 ^o to 70 ^o c
Operating Temperature:	0 ^o to 60 ^o c
Humidity:	5% to 95% (non-condensing)
Altitude:	Up to 10,000 feet (3,000 meters) above sea level (operating)
Isolation:	(Faceplate connections to Series Six common) Encoder Inputs } Stepper Outputs } 50 V dc Continuous Switch Inputs } 1500 V Peak Transient Relay Outputs }
Noise and Transient Immunity:	Switch inputs and relay outputs meet the requirements of: NEMA ICS 2-230 and ANSI C37.90A

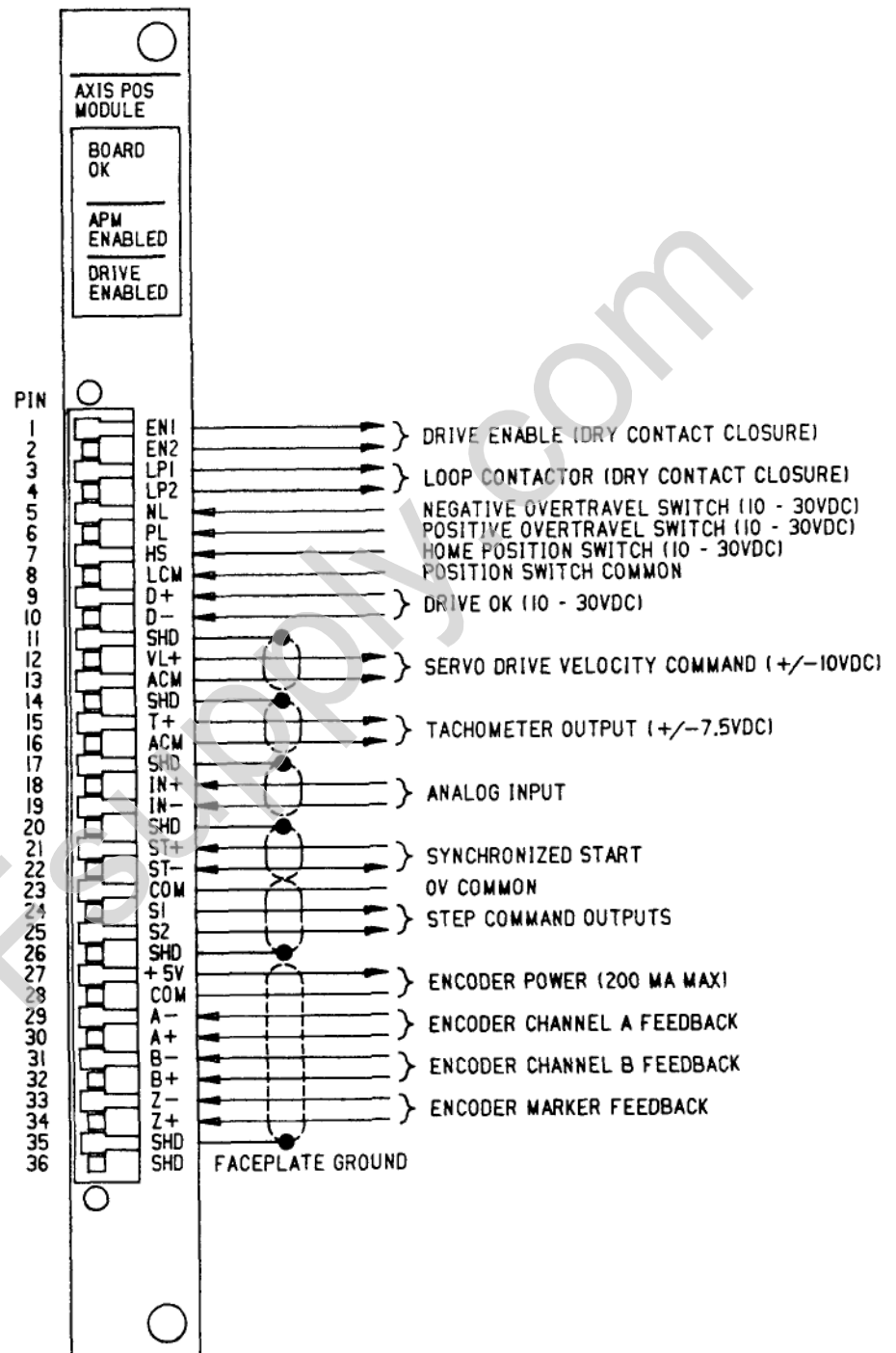


Figure 1. AXIS POSITIONING MODULE TYPE 2 FACEPLATE CONNECTIONS

TABLE 2. SPECIFICATIONS FOR FACEPLATE CONNECTIONS

INTERFACE	IN/OUT	CHARACTERISTICS
Drive Enable (optional)	output	Normally open relay contact; Contacts rated 24 V ac/dc, 1 amp maximum (resistive load only); dry contact
Loop Contactor (optional)	output	Same as Drive Enable.
Negative Overtravel Switch (optional)	Input	Requirements: CLOSED (ON) - IO-30 V dc OPEN (OFF) \leq 3 V dc; Input current - 10 ma @ 24 V; Input impedance = 2000 ohms; Interpretation: OFF = overtravel. Disable using SW3-3
Positive Overtravel Switch (optional)	Input	Same as Negative Overtravel Switch.
Home Switch (optional)	Input	Requirements: Same as Negative Overtravel. Interpretation: CLOSED (ON) = Negative side of home switch. OPEN (OFF) = Positive side of home switch.
Drive OK (optional)	Input	Requirements: CLOSED (ON) = 10 - 30 V dc OPEN (OFF) = \leq 3 V dc Input current: 10 ma @ 24 V Input impedance = 2000 ohms; Interpretation: CLOSED (ON) = Drive OK OPEN (OFF) = Drive Not OK Disable using SW3-4
Velocity Command	Output	Differential output of D/A converter with following characteristics: · Resolution: 13 bits including sign. · Linearity: .012% of full scale output · 4 500 microvolts maximum · Maximum output voltage: ± 10 V ± 3 V · Minimum output load resistance: 2000 ohms · Voltage between Analog Common (ACM) and Series Six Common: ± 4 V maximum.

TABLE 2. SPECIFICATIONS FOR FACEPLATE CONNECTIONS (Continued)

INTERFACE	IN/OUT	CHARACTERISTICS																		
Tachometer Output	output	<p>The Tachometer Output is derived from the A QUAD B encoder input.</p> <p>Characteristics:</p> <p>Output voltage: ± 8.0 V maximum</p> <p>Minimum load impedance: 2000 ohms</p> <p>Output common mode range: ± 1.0 V (Analog Common to Series Six Common)</p> <p>Gain: (Programmable)</p> <table data-bbox="753 585 1068 695"> <tr> <td>7.5 V = 200,000</td> <td>x 100 cts/min</td> </tr> <tr> <td>100,000</td> <td>x 100 cts/min</td> </tr> <tr> <td>50,000</td> <td>x 100 cts/min</td> </tr> <tr> <td>25,000</td> <td>x 100 cts/min</td> </tr> </table> <p>Offset at zero velocity: ± 1.0 mv maximum</p> <p>Output ripple:</p> <table data-bbox="716 772 1068 932"> <thead> <tr> <th>Gain</th> <th>Ripple</th> </tr> </thead> <tbody> <tr> <td>7.5 v = 200,000</td> <td>62 mv max</td> </tr> <tr> <td>7.5 V = 100,000</td> <td>125 mv max</td> </tr> <tr> <td>7.5 V = 50,000</td> <td>250 mv max</td> </tr> <tr> <td>7.5 V = 25,000</td> <td>500 mv max</td> </tr> </tbody> </table> <p>Output Polarity: Set by SW3-1</p> <p>Factory setting: Positive velocity causes negative output voltage.</p> <p>Encoder Requirements: Minimum recommended resolution is 2000 counts per motor shaft revolution (500 line encoder)</p>	7.5 V = 200,000	x 100 cts/min	100,000	x 100 cts/min	50,000	x 100 cts/min	25,000	x 100 cts/min	Gain	Ripple	7.5 v = 200,000	62 mv max	7.5 V = 100,000	125 mv max	7.5 V = 50,000	250 mv max	7.5 V = 25,000	500 mv max
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7.5 V = 25,000	500 mv max																			
Analog Input (optional)	Input	<p>A/D converter input with the following characteristics:</p> <p>Input range: -10.0 to +9.92 V dc or -5.00 to +4.966 V dc (selected by sw3-5)</p> <p>Gain factor: 1 count = 78.12 mv or 39.06 mv.</p> <p>Input impedance: 20 kohms</p> <p>Common Mode range: ± 15 V</p>																		
Synchronized Start (optional)		<p>Output on Master APM II; Input on Slave APM II.</p>																		

TABLE 2. SPECIFICATIONS FOR FACEPLATE CONNECTIONS (Continued)

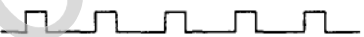



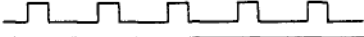
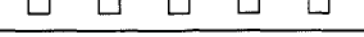



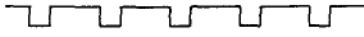
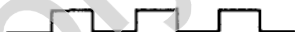



INTERFACE	IN/OUT		CHARACTERISTICS	
Step Command Outputs	Output	TTL open collector output with 1 kΩ pull-up resistor to isolated + 5 V. • Sink Output current: 30 mA max • Low Level Output voltage: 0.4 V max at 10 mA • Max pulse rate: 41.7 khz (49.5 khz with rate override = 110%) • Pulse width: 13.9 μs • Operating Modes:		
SELECTION	OUTPUT	FUNCTION	FORMAT OF SIGNAL	EXAMPLE OF SIGNAL OUTPUT
0 (default)	S1	STEP	HIGH PULSE	
	S2	DIRECTION	HIGH LEVEL (POSITIVE) DIRECTION	
			LOW LEVEL (NEGATIVE) DIRECTION	
1	S1	POSITIVE STEP	HIGH PULSE	
	S2	NEGATIVE STEP	HIGH PULSE	
2	S1	STEP	LOW PULSE	
	S2	DIRECTION	HIGH LEVEL (POSITIVE) DIRECTION	
			LOW LEVEL (NEGATIVE) DIRECTION	
3	S1	POSITIVE STEP	LOW PULSE	
	S2	NEGATIVE STEP	LOW PULSE	

TABLE 2. SPECIFICATIONS FOR FACEPLATE CONNECTIONS (Continued)

INTERFACE	IN/OUT	CHARACTERISTICS
Encoder Interface	Inputs	<p>Input Characteristics:</p> <ul style="list-style-type: none"> • Input type: Optically isolated, differential or single ended • Input voltage range: ± 15 V • Input threshold: <ul style="list-style-type: none"> • Single ended: + 1.0 V nominal • Differential: + 0.05 V \pm 0.03 V • Input impedance: 5 kohms nominal from each input to isolated common. • Number of inputs: 3 (Channel A, Channel B, and Marker) • Line terminations: 180 ohm (nominal) line terminations are provided for use in differential mode. Terminations are selected using SW2-1 through SW2-3 • Maximum input frequency: 100 khz (each channel) • Quadrature tolerance: 90 degrees \pm 45 degrees • Quadrature error detection: Simultaneous transitions on the Channel A and Channel B inputs will be detected as loss of quadrature. • Encoder power: +5.0 V \pm .25 V @ 200 mA maximum • Encoder direction of travel: Channel A leading Channel B = motion in positive direction. <p style="text-align: center;">Motion in Positive Direction</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">Channel A </div> <div style="text-align: center;">Channel B </div> </div> <p style="text-align: center;">Motion in Negative Direction</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">Channel A </div> <div style="text-align: center;">Channel B </div> </div> <ul style="list-style-type: none"> • Z Channel (Marker) Input Polarity: A positive transition of the Z Channel is used in the FIND HOME cycle to initialize position • Feedback cable: 4 twisted pair, 22 gage with overall shield and jacket. 100 ft maximum length.

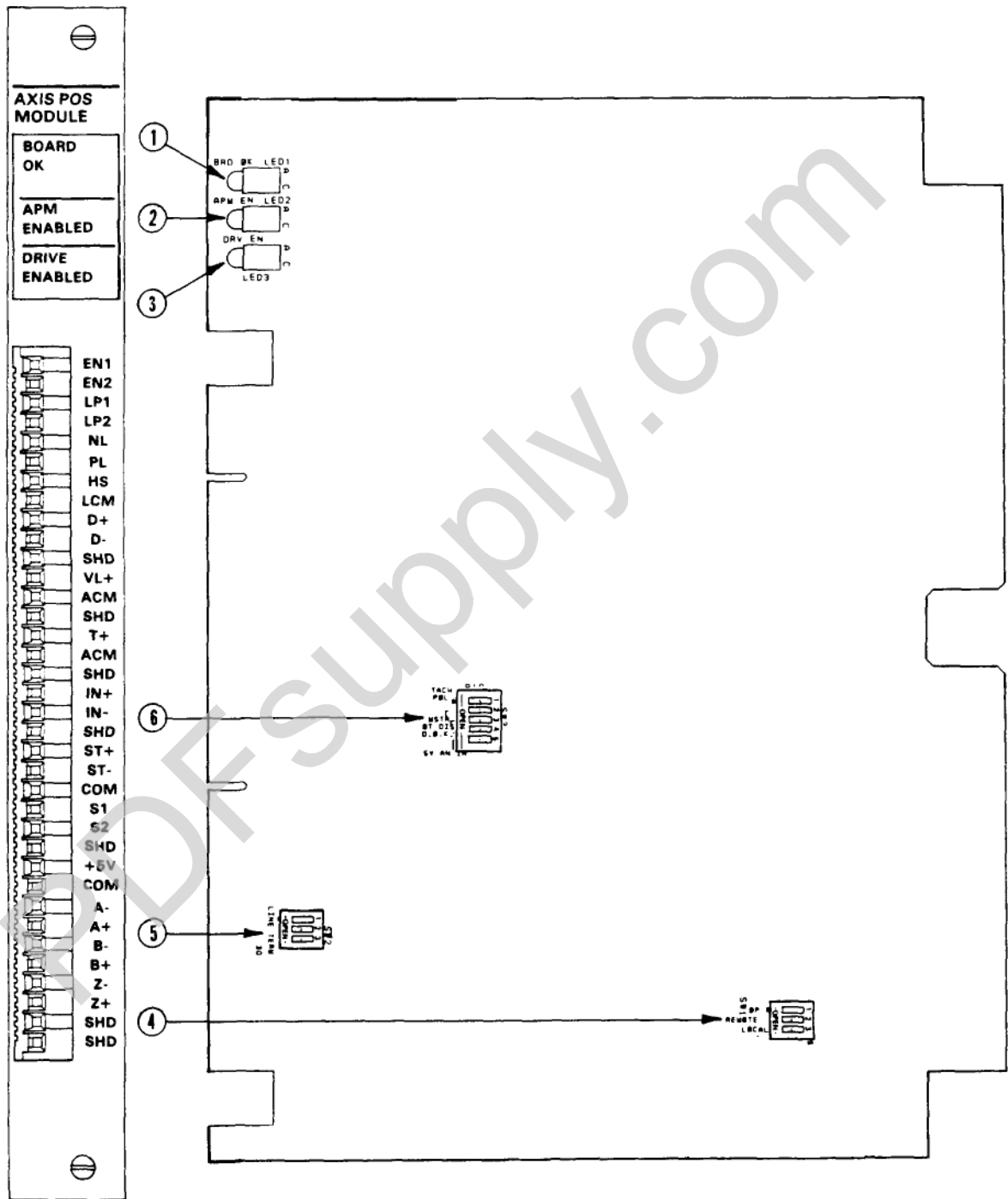


Figure 2. AXIS POSITIONING MODULE TYPE 2 USER ITEMS (Part 1 of 3)

INDICATOR LIGHTS

- | | |
|-----------------|--|
| ① BOARD OK | ON: APM has passed self-diagnostic tests. These tests are performed when the I/O rack is turned on and whenever an ERROR condition occurs.
OFF: APM hardware failure. |
| ② APM ENABLED | ON: Board is OK and APM has received the ENABLE APM Command.
OFF: Turned off during power-up self-diagnostics, by any ERROR condition, or upon receiving the RESET Command. |
| ③ DRIVE ENABLED | ON: APM is capable of controlling position.
OFF: Turned off following power-up, in an ERROR condition or upon a RESET or DISABLE DRIVE Command. |

USER ITEMS
Figure 2 (part 2 of 3)

MODULE DIP-SWITCH SETTINGS

④ Synchronizing Clock

Independent (Factory Set Configuration) _____
 Master (Source of Backplane Clock) _____
 Slave Clock (Receives Clock from Backplane) _____

SW1-1	SW1-2	SW1-3
OPEN*	OPEN*	CLOSED*
CLOSED	OPEN	CLOSED
CLOSED	OPEN	OPEN

SWITCH NO.	FUNCTION CLOSED = ON, OPEN = OFF	STATE
SW2-1	Encoder Channel A Input Differential Input (terminated) Single-Ended Input	CLOSED OPEN*
⑤ SW2-2	Encoder Channel B Input Differential Input (Terminated) Single-Ended Input	CLOSED OPEN*
SW2-3	Encoder Channel Z Input Differential Input (Terminated) Single-Ended Input	CLOSED OPEN*
SW3-1	Positive Velocity Causes Negative Tachometer Output Positive Tachometer Output	OPEN* CLOSED
SW3-2	Sync Start Signal Direction Selection Master (Output) Slave (Input)	CLOSED* OPEN
⑥ SW3-3	Overtravel Limit Switches Enable Disable	OPEN* CLOSED
SW3-4	Drive OK Input Enable Disable	OPEN* CLOSED
SW3-5	Full Scale Analog Input Selection ± 5 V ± 10 V	CLOSED OPEN*

* = Factory Set Default Position.

USER ITEMS
 Figure 2 (part 3 of 3)

INSTALLATION

The Axis Positioning Module Type 2 may be installed in a Model 60 CPU rack or in a Series Six PC High-Capacity I/O rack. A maximum of three (3) APM II modules may be installed in a Model 60 CPU rack. A maximum of six (6) APM II modules may be installed in any Series Six High-Capacity I/O rack.

Before installing the module, set the Dual In-Line Package (DIP) switches adjacent to the card slot on the rack backplane where the module is to be placed to establish which group of 32 consecutive input and output points in the CPU I/O tables will be used by the module being installed. For further information on the I/O DIP switch settings, refer to Figure 3 and Figure 4.

Set the DIP switches SW-1, SW-2, and SW-3 on the module to the required operating configuration for this application. For reference refer to Figure 2 user items or the APM II Manual, GEK-90800.

Remove power from the rack while installing the module. Use the extraction/insertion tool furnished with the Series Six rack to remove or install the module.

Guide the faceplate over the circuit board so that proper contact is made. Then secure the faceplate to the rack using the thumbscrews at the top and bottom of the faceplate.

Connect the field wiring to the terminal board on the faceplate at this time. Verify that the proper wiring has been made. For guidance on the wiring of the external circuits to this module refer to the APM II Manual, GEK-90800.

WARNING

Voltages from user field devices could be present on the faceplate terminals of this module, even if the power supply in the Model 60 CPU rack or the I/O rack is off. Care should be taken when handling the faceplate of this module or any wires connected to it.

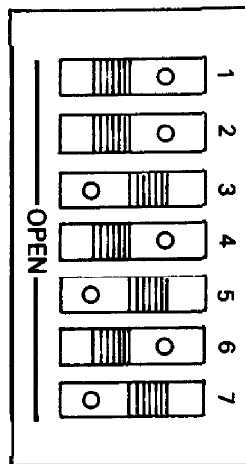


Figure 3 TYPICAL I/O BACKPLANE DIP SWITCH

I/O ADDRESSING

Figure 4 shows the allowable I/O addresses and corresponding Dual In-Line Package (DIP) switch settings.

INPUT NUMBER	DIP SWITCH POSITION					INPUT NUMBER	DIP SWITCH POSITION					INPUT NUMBER	DIP SWITCH POSITION								
	7	6	5	4	3		7	6	5	4	3		7	6	5	4	3				
1-32						353-384	X		X	X						705-736	X		X	X	
33-64					X	385-416	X	X								737-768	X		X	X	X
65-96				X		417-448	X	X		X						769-800	X	X			
97-128				X	X	449-480	X	X	X							801-832	X	X			X
129-160			X			481-512	X	X	X	X						833-864	X	X		X	
161-192			X		X	513-544	X									865-896	X	X		X	X
193-224			X	X		545-576	X			X						897-928	X	X	X		
225-256			X	X	X	577-608	X		X							929-960	X	X	X		X
257-288		X				609-640	X			X	X					961-992	X	X	X	X	
289-320		X			X	641-672	X		X							993-1024	X	X	X	X	X
321-352		X		X		673-704	X		X	X					(NOT USED)						

X = SWITCH IN OPEN POSITION (DEPRESSED TO THE LEFT)
 SWITCHES NO.1 AND NO.2 SHOULD BE IN CLOSED POSITION

Figure 4. DIP SWITCH SETTINGS

ORDERING INFORMATION

Circuit Board and Faceplate

Circuit Board

Faceplate

IC600BF917D

IC600YB917D

IC600FP917A

CATALOG NUMBER REVISION SUFFIX

The equipment listed above having the catalog numbers shown and the same equipment having a higher alpha suffix is designed for listing by UL for use as auxiliary control devices.



This symbol on the nameplate means the product is listed by Underwriters Laboratories Inc. (UL Standard No. 508, Industrial Control Equipment, subsection Electronic Power Conversion Equipment.)

For further information, contact your local GE Fanuc sales office.

GE FANUC AUTOMATION NORTH AMERICA, INC., CHARLOTTESVILLE, VIRGINIA

MAY 1987