### 5.3 Initialisation and Reset

When the GPIB control module is switched on, it is initialised to the following states:

Power supply X voltage setting - 0V
Power supply X current setting - 0mA
Power supply Y voltage setting - 0V
Power supply Y current setting - 0mA
Terminator set to - LF (Line Feed)
SRQ conditions - No SRQ

Once the unit is connected to the GPIB it can be reset to these initialised states in any of three ways:

1) By switching the unit off and on again. NB this will disable the Bus for a short period.
2) By sending the DCL command over the Bus.
3) By sending the SDC command over the Bus when the unit is in the TA state or LA state.

Since the unit is software controlled it is theoretically possible to get it in to a state from which it will not recover by illegal bus operations. Should this happen it must be reset by turning the unit off and on again.

**Important Note:** on twin supplies, if the AC line power switch on the Y power supply unit is switched off the power to the GPIB control module will be removed but power to the X power supply unit will remain. The X PSU will stay set to its previously set voltage and current levels until the AC line switch on the Y PSU is switched on again, upon which it will reset to its initialised state.

### 5.4 Setting the Voltage and Current Levels

When the unit is in the LA state the voltage and current levels can be changed by sending it an ASCII character string of the correct syntax.

The normal syntax is as follows:

Power supply identifier (X or Y); Numerical value; Electrical unit identifier (V or mA); Terminator (normally LF).

For single units the 'power supply identifier' can be omitted. If it is included it must be X. Case is ignored.

For twin units the 'power supply identifier' is X for the left-hand supply and Y for the right-hand supply. Case is ignored. If the identifier is omitted, it is assumed to be the same as the last identifier sent. If the identifier is omitted in the first string sent after the interface has been cleared, it is assumed to be X.

The numeric value is a floating point decimal number. Digits below the minimum setting resolution (.01 for volts, 10 for mA) are ignored. Values, above the maximum allowable setting will cause the whole string to be ignored.

The electrical unit identifier must be V (for volts) or mV (for millivolts) when setting voltage, and mA (for milliamperes) or A (for amps) when setting current. Case is ignored.

The string is terminated by an LF (line feed) character. This can be changed to CR (carriage return), see section 5.7. The Terminator can be omitted altogether if EOI is sent with the last character of the string, see section 5.7.

Examples of valid strings are as follows:

X 1 2 V LF
Y 2 3 . 4 5 V LF
X 1 1 0 m A LF
Y 1 8 2 0 m A LF

When it is required to change several settings simultaneously the strings can be linked together with a single terminator at the end. Where two successive settings apply to the same power supply the power supply identifier can be omitted for the second setting.



Thus the four strings above could be sent as a single string as follows:

X 1 2 V 1 1 0 m A Y 2 3 . 4 5 V 1 8 2 0 m A LF

After the terminator has been received, the unit is enabled to accept one further bus command (eg. Unlisten). This command is not acted upon until the unit has checked the syntax of the string and carried out the appropriate actions, a delay of typically 1½ msecs.

### 5.5 Maximum Voltage and Current Settings

With a 30V/2A supply the maximum voltage that can be set when the full output current capability of 2.2A is required, is limited to 31V. Providing the current limit is set to 1.1A or below, however, voltages up to 36V may be set. If an attempt is made either to set a voltage above 31V when the current setting is above 1.1A, or to set a current above 1.1A when the voltage setting is above 31V, the control string will be ignored.

With 15V/4A supplies a similar facility is available. The equivalent figures are 15.5V with 3.98A and 18V with 1.99A.

### 5.6 Voltage and Current Setting Response Speeds

Although the GPIB control module responds to a control string in just over a millisecond, it can take considerably longer for the power supply itself to settle to a new value. This is caused by the internal time constants of the power supply.

When setting a current, the time constant is typically 2msecs. This means that for a 1A change the current limit will settle to within 10mA of its final value within 10 msecs.

When setting a voltage, the time constant is typically 50 msecs. This means that the voltage will settle to within 10mV of its final value in around 115 msecs for a 100mV change, or 230 msecs for a 1V change, or 400 msecs for a 30V change. If the load current falls below 10mA or so, the setting time will be increased when the voltage is being reduced because of the extra time taken to discharge the output capacitor of the power supply (33uf). Consequently if rapid response times are required at very low currents, a dummy load should be added to maintain some output current.

NB: Setting times can be calculated using the following formula:
Setting time to 10% of the step value = 2.3T, to 1% = 4.6T, to 0.1% = 6.9T. Where T is the time constant.

### 5.7 Power Supply Status Readback

When the unit is put into the TA state it will immediately place a string of ASCII characters onto the Bus describing the operating status of the power supply or power supplies.

For a single supply the string is:

X V LF when the PSU is in constant voltage (CV) mode, or
X I LF when the PSU is in constant current (CI) mode.

For a twin supply the string is:

X V Y V LF for example (both PSUs in CV mode).

The exception to this is when the unit is put into the TA state following a 'current measurement' command (see section 5.12).

### 5.8 Programmable Terminator (LF or CR)

As initialised the unit requires an LF character as a terminator when in the LA state, and sends an LF character as a terminator when in the TA state.

Some bus controllers send and require a CR character as a terminator. The unit can be made to comply with this by sending it an SCG command with secondary address 6, see section 5.9.

The unit also accepts EOI as a terminator. Thus if the controller sets EOI true on the final character of the control string, no further terminating character is required. Any character sent after the final character (identified as the final character by EOI) will be accepted as the first character of a new string. A CR or LF character at the start of a new string will be ignored and will not cause a syntax error.