SPECTRON

CONTROL LANGUAGE COMMANDS

SE 1450 STROKE GENERATOR

Version: 052804

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Spectron Control Language Commands

SE 1450 STROKE GENERATOR

General Command Format Notes

1. **Serial Operation vs. IEEE488 Operation -** Spectron Control Language Commands (SCL Commands) are entered directly as specified below during IEEE488 operation. If the SE 1450 Stroke Generator is being controlled through the Serial Port, however, the "Command Mode" must be entered by preceding each Command with a colon (:); i.e. READ is a valid command in IEEE488 Operation, :READ is valid in Serial Operation.

   Caution: Failure to precede a SCL Command with a colon (:) in Serial Operation may lead to unpredictable results, including having to reset the System before proceding.

2. **Only the First 3 Characters of a Command are Significant -** The READ command above will be recognized as valid if the user types REA, READ, REAxxx in IEEE488 Operation, or if the user types :REA, :READ, :REAxxx in Serial Operation. If the first 3 characters of a command are not recognized as valid; i.e. the user types REED, a "BAD COMMAND" response will be generated and no futher action will be taken by the System.

3. **Separate a Valid Command from the Parameters associated with the Command with One or More Spaces <sp>. Likewise, Separate Multiple Parameters with One or More Spaces <sp> -** The CENTER command requires two parameters representing the X and Y offset voltages (see *Summary*, below), and would be entered as follows: CENTER<sp>-.532<sp>1.217.
4. **Multiple Commands MAY NOT be Entered on the Same Line, However, Multiple Pattern Generating Commands may be Created, Viewed, Edited, Saved, and Recalled Through Appropriate use of the ADD, READ, EDIT, SAVE, and LOAD Commands and with a Working Understanding of how the Current Work Area, Described Directly Below, Functions.**
5. **The Current Work Area Allows Complicated Images to be Created, Edited, Saved and Recalled by Storing a Series (40 maximum) of SLINE, SCROSS and SPATCH Commands -** Directly entering a pattern generating command, such as SLINE, SCROSS, or SPATCH, will clear the Current Work Area and create a Line 1 in the Area reflecting the command entered. Further enhancements to the image pattern are generated using the ADD command which, with appropriate parameters, will add Line 2, Line 3, … Line 40 to the Current Work Area.

General Command Format Notes (continued)

Caution: Inadvertently issuing a pattern generating command directly at this point, rather than using the ADD command consistently, will clear the Current Work Area, as above described, and will result in the loss of the previously created elements of the final image pattern.

The series of pattern generating commands in the Current Work Area can be viewed using the READ command, changed by using EDIT, deleted with the DELETE command, and permanently stored (in EEPROM) in one of 15 numbered locations using the SAVE command. The command series can later be retrieved into the Current Work Area with the LOAD command.

The SE 1450 Stroke Generator generates a live image based on the contents of the Current Work Area.

Caution: If the complete series of pattern generating commands in the current work area cannot be displayed due to the constraints of the time slot allocated for display generation, the 'IMAGE TRUNCATED, IN SYMBOL MODE' or the [IMAGE TRUNCATED, IN W/RASTER MODE] message will be generated as the last report line of the READ command. If the complete series of pattern generating commands is displayed, the 'IMAGE COMPLETE. IN SYMBOL MODE' or the 'IMAGE COMPLETE, IN W/RASTER MODE' message will be generated as the last report line of the READ command.

Summary of Stroke Generator Commands and Results

Section 1, SCL Pattern Generating Commands

SCL Command	***<Parameters>*** **[Valid Text Entries or Valid Numeric Range]**	***Description***	***Example*** **[Reply]** ***Note: SLINE command will show both Serial & IEEE488 version of the command - Remaining commands will show only IEEE488 version of the command.***
NOStroke	[No Parameters]	Primarily used to determine offset voltages. This Command generates NO Stroke Pattern and is NOT a 'valid Pattern Generating command' that can be used with the ADD or EDIT commands. This command does not affect X or Y stroke waveforms in any manner – timing or voltages (including zero reference, center reference, corner reference)	**NOSTROKE<CR>** [00 'PATTERN OK]
SCROSS	same as SLINE command, above.	Generates a centered cross pattern using default values. All parameters of the SLINE command are retained for consistency, however the <line orientation> and <patch spacing> parameters will not affect the pattern generated. The <line length> parameter will determine the size of the cross pattern.	**SCROSS<CR>** [00 'Pattern OK] **READ<CR>** [1 'SCROSS '0.000 '0.000 'VERT 'FAST 'SHORT '0.065 'VOLT] ['IMAGE COMPLETE, IN W/RASTER MODE] **SCROSS 0 0 VERT FAST LONG<CR>** [00 'Pattern OK] **READ<CR>** [1 'SCROSS '0.000 '0.000 'VERT 'FAST 'LONG '0.065 'VOLT] ['IMAGE COMPLETE, IN W/RASTER MODE]

Section 1, SCL Pattern Generating Commands (continued)

SCL Command	*<Parameters>* **[Valid Text Entries or Valid Numeric Range]**	*Description*	*Example* **[Reply]** ***Note: SLINE command will show both Serial & IEEE488 version of the command - Remaining commands will show only IEEE488 version of the command.***
SLINE	<X offset voltage> [Numeric - +/- TBD] <Y offset voltage> [Numeric - +/-TBD] <line orientation> [Text - VERtical, HORizontal] <ramp speed> [Text - SLOw, FASt, FAIL] <line length> [Text - SHOrt, MEDium, LONg] <patch spacing> [Numeric - +TBD]	Generates a centered line using default values as follows: X offset voltage = 0; Y offset voltage = 0; line orientation = VERTICAL; ramp speed = FAST; line length = SHORT; patch spacing = .065. User entered numeric X and Y offset voltages will move the line from the center. User entered text (HORIZONTAL or VERTICAL) is used to determine line orientation. User may vary stroke writing speed using one of the text parameters (SLOW, FAST, FAIL). The purpose of the FAIL parameter is to check the phospher protect circuit in the HUD through a too slow writing speed. User entered text (SHORT, MEDIUM, LONG) will vary the length of the line generated. An incorrect User entered numeric value for patch spacing will not will not affect the line generated, however, it will return an unsucessful or incomplete status code. It is effective as a parameter in the SPATCH command, below, to determine line spacing within the SPATCH pattern.	**:SLIN <CR>** (Serial Mode) **SLIN<CR>** (IEEE488 Mode) [00 'Pattern OK] *Note: The above command will clear the Current Work Area and generate the following command line 1 in the Current Work Area. This may be viewed, if desired, by using the READ command, below.* **:READ<CR>** (Serial Mode) **READ<CR>** (IEEE488 Mode) [1 'SLINE '0.000 '0.000 'VERT 'FAST 'SHORT '0.065 'VOLT] ['IMAGE COMPLETE, IN W/RASTER MODE] **:SLINE 5 -2.5 HORIZONTAL <CR> (**Serial Mode) **SLINE 5 -2.5 HORIZONTAL <CR>** (IEEE488 Mode) [00 'Pattern OK] **:READ<CR>** (Serial Mode) **READ<CR>** (IEEE488 Mode) [1 'SLINE '5.000 '-2.500 'HORZ 'FAST 'SHORT '0.065 'VOLT] ['IMAGE COMPLETE, IN W/RASTER MODE] *Note: The last 3 parameters were not changed by the User, so the default values are retained.*

Section 1, SCL Pattern Generating Commands (continued)

SCL Command	*<Parameters>* **[Valid Text Entries or Valid Numeric Range]**	*Description*	*Example* **[Reply]**
SPATCH	same as SLINE command, above.	Generates a centered line patch pattern. All parameters of the SLINE command are retained and will affect the patch pattern generated. The <patch spacing> parameter will determine the spacing between the lines of the patch pattern.	**SPATCH<CR>** [00 'Pattern OK] **READ<CR>** [1 'SPATCH '0.000 '0.000 'VERT 'FAST 'SHORT '0.065 'VOLT] ['IMAGE COMPLETE, IN W/RASTER MODE] **SPATCH -1.215 -1.215 HOR SLO LON .75<CR>** [00 'Pattern OK] **READ<CR>** [1 'SPATCH '-1.215 '-1.215 'HORZ 'SLOW 'LONG '0.750 'VOLT] ['IMAGE COMPLETE, IN W/RASTER MODE]

Section 2, SCL Design Commands

SCL Command	*<Parameters>* **[Valid Text Entries or Valid Numeric Range]**	*Description*	*Example* **[Reply]**
ADD	<valid Pattern Generating command> [SLINE, SCROSS or SPATCH and all parameters associated with these commands]	The ADD command is used to add consecutive numbered lines of Pattern Generating Commands to the Current Work Area. See SLINE, SCROSS, and SPATCH commands above. **Note: The ADD command must be used continuously to avoid inadvertent erasure of all image generating command lines in the Current Work Area by entering a Pattern Generating Command directly. Direct entry of a SLINE, SCROSS or SPATCH command will replace the contents of the Current Work Area with the directly entered command. (Use SAVE and READ commands frequently to monitor the status of the Current Work Area.)**	*Note: Because the Current Work Area is normally not empty, it is recommend that all image sequences be initiated by a direct image generating command. This will clear the Current Work Area and create a line 1 according to the direct command entered. Subsequent lines are added to the planned sequence using the ADD command.* **SLINE<CR>** [00 'PATTERN OK] **ADD SCROSS .5 .5 <CR>** [00 'PATTERN OK] **READ<CR>** [1 'SLINE '0.000 '0.000 'VERT 'FAST 'SHORT '0.065 'VOLT] [2 'SCROSS '0.500 '0.500 'VERT 'FAST 'SHORT '0.065 'VOLT] ['IMAGE COMPLETE, IN W/RASTER MODE] *Note: The image generated by the SE 1450 Stroke Generator will now be displaying both image patterns stored in the Current Work Area.*

Section 2, SCL Design Commands (continued)

SCL Command	*<Parameters>* **[Valid Text Entries or Valid Numeric Range]**	*Description*	*Example* **[Reply]**
DELete	<pattern #> [1 - 20]	The DELETE command is used to remove a numbered pattern generating command from the Current Work Area. If only one pattern is in the Current Work Area it may **NOT** be deleted.	*Note: Look at the contents of the Current Work Area* **READ<CR>** [1 'SLINE '0.000 '0.000 'VERT 'FAST 'SHORT '0.065 'VOLT] [2 'SPATCH '0.500 '0.500 'VERT 'FAST 'SHORT '0.065 'VOLT] [13 'IMAGE COMPLETE, IN W/RASTER MODE] Note: Delete the SLINE pattern. **DELETE 1<CR>** [01 'DELETE OK] *Note: Look at the contents of the Current Work Area. Work area 1 was deleted and former Work area 2 is now 1.* **READ<CR>** [1 'SPATCH '0.500 '0.500 'VERT 'FAST 'SHORT '0.065 'VOLT] [13 'IMAGE COMPLETE, IN W/RASTER MODE]

Section 2, SCL Design Commands (continued)

SCL Command	*<Parameters>* **[Valid Text Entries or Valid Numeric Range]**	*Description*	*Example* **[Reply]**
EDIt	<pattern #> [1 - 31] <valid Pattern Generating command> [SLINE, SCROSS or SPATCH and all parameters associated with these commands]	Use the EDIT command to change a numbered image pattern in the Current Work Area to a pattern of the users choice.	*Note: Look at the contents of the Current Work Area* **READ<CR>** [1 'SLINE '0.000 '0.000 'VERT 'FAST 'SHORT '0.065 'VOLT] [2 'SCROSS '0.005 '0.005 'VERT 'FAST 'SHORT '0.065 'VOLT] ['IMAGE COMPLETE, IN W/RASTER MODE] *Note: Change line 2 to a patch instead of a cross.* **EDIT 2 SPATCH 1.5 1.5** [00 'PATTERN OK] *Note: Look at the contents of the Current Work Area* **READ<CR>** [1 'SLINE '0.000 '0.000 'VERT 'FAST 'SHORT '0.065] [2 'SPATCH '1.500 '1.500 'VERT 'FAST 'SHORT '0.065 'VOLT] ['IMAGE COMPLETE, IN W/RASTER MODE]
LOAd	<image #> User [1 – 20] Factory [21 – 27]	The LOAD command will retrieve the contents of an EEPROM image storage area to the Current Work Area. This will replace whatever is currently in the Current Work Area. There are 27 storage areas available from which to retrieve image generating data, however, the User may only save data to the first 20.	*Note: Assume the example image associated with the SAVE command, above, is stored in image area 4.* **LOAD 4<CR>** [03 'LOAD OK] *Note: Look at the Current Work Area.* **READ<CR>** [1 'SLINE '0.000 '0.000 'VERT 'FAST 'SHORT '.065 'VOLT] [2 'SPATCH '0.500 '0.500 'VERT 'FAST 'SHORT '0.065 'VOLT] [13 'IMAGE COMPLETE, IN W/RASTER MODE]

Section 2, SCL Design Commands (continued)

SCL Command	*<Parameters>* **[Valid Text Entries or Valid Numeric Range]**	*Description*	***Example*** **[Reply]**
REAd	(No Parameters)	Displays the contents of the Current Work Area	*Note: Clear the Current Work Area and create a Pattern Generating Command.* **SCROSS 3 7<CR>** [00 PATTERN OK] *Note: Display the Current Work Area.* **READ<CR>** [1 'SCROSS '3.000 '7.000 'VERT 'FAST 'SHORT '0.065 'VOLT] [13 'IMAGE COMPLETE, IN W/RASTER MODE] *Note 1: In limited cases where there are numerous and complicated series of Pattern Generating Commands stored in the Current Work Area, the time slot allocated for the complete Image Display may be insufficient to generate the complete image intended. In such a case, the last Report Line of the READ Command will report [42 'IMAGE TRUNCATED, IN SYMBOL MODE] or [43 'IMAGE TRUNCATED, IN W/RASTER MODE. See SREAD Command, below, for a concise method of determining the correct state of the displayed image* . *Note 2: If either one or both of the following Status Codes is generated, the Output Strings in Note 1, above will NOT be generated:* *[44 'SYM CMD &/OR DU BUSY NOT PRESENT]* *[45 'RS170 VIDEO NOT PRESENT]*

Section 2, SCL Design Commands (continued)

SCL Command	*<Parameters>* **[Valid Text Entries or Valid Numeric Range]**	*Description*	*Example* **[Reply]**
SAVe	<image #> [1 - 20]	The SAVE command will save the contents of the Current Work Area to an EEPROM numbered image storage area, replacing the contents of that area. There are 20 storage areas available. If there is nothing in the Current Work Area and it is saved, the storage area to which it is saved will likewise contain nothing. The SAVE command is used in conjunction with the LOAD command, below, to save and retrieve images to and from the Current Work Area.	*Note: Look at the contents of the Current Work Area* **READ<CR>** [1 'SLINE '0.000 '0.000 'VERT 'FAST 'SHORT '0.065 'VOLT] [2 'SPATCH '0.500 '0.500 'VERT 'FAST 'SHORT '0.065 'VOLT] [13 'IMAGE COMPLETE, IN W/RASTER MODE] *Note: Save the image (which is comprised of 2 patterns) to an EEPROM storage area.* **SAVE 4<CR>** [02 'SAVE OK] *Note: The two patterns have been copied to image storage area 4 and can later be retrieved from that area to the Current Work Area using the LOAD command, below. The two patterns are also still located in the Current Work Area and may be replaced, deleted or changed without affecting the image now stored in image area 4.*

Section 2, SCL Design Commands (continued)

SCL Command	*<Parameters>* **[Valid Text Entries or Valid Numeric Range]**	*Description*	*Example* **[Reply]**
SREad	(No Parameters)	This command offers a concise method of determining whether all of the Pattern Generating Commands stored in the Current Work Area are, in fact, reflected in the displayed image.	*Note: All Pattern Generating Commands in the Current Work Area are reflected in the displayed image.* **SREAD<CR>** [13 'IMAGE COMPLETE, IN W/RASTER MODE] *Note: Due to the constraints of the time slot allocated for generating the complete image described in the Current Work Area, all of the Pattern Generating Commands are not reflected in the displayed image.* **SREAD<CR>** [43 'IMAGE TRUNCATED, IN W/RASTER MODE] *Note: If either Status Code 44 or 45 is generated (see, REAd command, above.) the "IMAGE TRUNCATED messages will not appear.*

Section 3, SCL System Commands

SCL Command	*<Parameters>* **[Valid Text Entries or Valid Numeric Range]**	*Description*	*Example* **[Reply]**
ADJust	(No Parameters	The ADJUST command is used to adjust the Stroke output to compensate for variation in loading caused by variation in HUDs and the associated connection hardware. No ADJUST is performed on power up of the SE 1450 Stroke Generator -- a default calibration is used. It is recommended that an ADJUST be performed before each new HUD is tested A suitable warm up and stabilization for the HUD and Stroke Generator should be permitted. The SE 1450 Stroke Generator's recommended warm up time is a minimum of 5 minutes.	**ADJUST <CR>** [19 'ADJUST OK] Note: The following will be returned when the HUD loading is at least 10 times greater than expected. [46 'HIGH LOAD, ADJUST STILL MADE] Note: If the HUD loading is outside the compensation range of the SE 1450 Stroke Generator, the following will be returned. [47 'LOAD ADJUST ERROR, DEFAULT VALUES INPUT] To check for proper functioning of the SE 1450 Stroke Generator, remove the HUD connection and rerun the ADJUST command.
BIT	(No parameters)	The BIT command runs a complete test and check of all system components to ensure both functionality and calibration of the test system.	**BIT<CR>** [09 'BIT COMPLETED, CHECK STATUS]

Section 3, SCL System Commands (continued)

SCL Command	***<Parameters>*** **[Valid Text Entries or Valid Numeric Range]**	***Description***	***Example*** **[Reply]**
CENter	<X voltage> [Numeric - TBD] <Y voltage> [Numeric - TBD]	The CENTER command will offset the center of the raster display relative to the center of the stroke display.	*Note: Without parameters, the CENTER command will return the currently set centerpoint of the raster display relative to the centerpoint of the stroke display.* **CENTER<CR>** [CENTER ‘numeric X voltage - TBD ‘numeric Y voltage - TBD] *Note: To set the centerpoint of the raster display relative to the centerpoint of the stroke display, enter the X and Y voltage parameters with the CENTER command.* **CENTER -1.108 .259<CR>** [08 ‘CENTER OK]
CORner	<X voltage> [Numeric - TBD] <Y voltage> [Numeric - TBD]	The CORNER command is used in conjunction with the CENTER command, below, to determine the overall size of the raster display. It determines the location of the Upper Left Corner of the raster display. The default values for the CORNER command parameters are to be determined (TBD).	*Note: Without parameters, the CORNER command will return the currently set Upper Left Corner of the raster display.* **CORNER<CR>** [CORNER ‘numeric X voltage - TBD ‘numeric Y voltage - TBD] *Note: To set the Upper Left Corner of the raster display, enter the X and Y voltage parameters with the CORNER command.* *The example below is for a 21° x 21° raster field of view centered at 0,0.* **CORNER -8.5409 7.1728<CR>** [06 ‘CORNER OK]
*IDn?	None	Displays the System ID, Serial Number, and Code Version.	***IDN?** [‘SpectronEngineering, SE1450,SN12345,S_23SA

Section 3, SCL System Commands (continued)

SCL Command	***<Parameters>*** **[Valid Text Entries or Valid Numeric Range]**	***Description***	***Example*** **[Reply]**
ISTatus	(No parameters)	The ISTATUS command reports the status of the last internal test of the SE 1450 Stroke Generator.	**ISTATUS<CR>** [10 'INTERNAL TEST OK] The ISTATUS command has the following failure indications: [48 'ISTATUS FAIL, RERUN BIT BEFORE REPAIR] [49 'ISTATUS FAIL, CHECK PWR SUPPLY]
LTV	ON	**Note: Only effective if X-Y Video is installed.** Allows the X-Y Video Display to reflect the output from SCL commands without a HUD.	**LTV ON<CR>** [17 'LEADER TV ONLY ON, HUD NOT REQUIRED']
LTV	OFF	Required when HUD is mounted in the test position.	**LTV OFF<CR>** [18 'LEADER TV ONLY OFF, HUD REQUIRED']
LTV	None	Reports the status of the LTV	**LTV<CR>** [18 'LEADER TV ONLY OFF, HUD REQUIRED]
RASter ON RASter OFF	(No parameters) (No parameters)	**LIMITED COMMANDS: RASTER ON and RASTER OFF will only function properly with additionally supplied Spectron stand alone HUD Test Bench Components with the Symbol Mode Control switch in the AUTO position..** RASTER ON and RASTER OFF is intended to control the raster image through software control. If conditions are such that software control is not effected through these commands, an appropriate error message will be displayed. See Status Codes 27 and 28.	**RASTER ON<CR>** [04 'RASTER ON OK] **RASTER OFF<CR>** [05 'RASTER OFF OK]

Section 3, SCL System Commands (continued)

SCL Command	***<Parameters>*** **[Valid Text Entries or Valid Numeric Range]**	***Description***	***Example*** **[Reply]**
TSTatus	(No parameters)	The TSTATUS command reports the status of the complete test system, to include the integrity of any customer supplied signals to the test system.	**TSTATUS<CR>** [11 'TOTAL TEST OK] The TSTATUS command has the following failure indications: [50 'TSTATUS FAIL, RERUN BIT BEFORE REPAIR] [51 'TSTATUS FAIL, CHECK PWR SUPPLY] [52 'TSTATUS FAIL, EXT INPUTS NOT PRESENT]

Section 3, SCL System Commands (continued)

SCL Command	***<Parameters>*** **[Valid Text Entries or Valid Numeric Range]**	***Description***	***Example*** **[Reply]**
UNIts	DEGREE, VOLTS	The UNITS command determines whether the input parameters associated with the Pattern Generating Commands (SLINE, SCROSS and SPATCH) are to be processed as voltage or degree offsets. The default is VOLT.	*Note: Assume there is an SLINE Pattern Generating Command and an SCROSS Pattern Generating Command in the Current Work Area.* **UNITS VOLT<CR>** [15 ‘POSITION UNITS IN VOLTs] **READ<CR>** [1 ‘SLINE ‘0.000 ‘0.000 ‘VERT ‘FAST ‘SHORT ‘0.065 ‘VOLT] [2 ‘SCROSS ‘0.500 ‘0.500 ‘VERT ‘FAST ‘SHORT ‘0.065 ‘VOLT] [13 ‘IMAGE COMPLETE, IN W/RASTER MODE] **UNITS DEGREE<CR>** ’14 ‘POSITION UNITS IN DEGREES **READ<CR>** [1 ‘SLINE ‘0.000 ‘0.000 ‘VERT ‘FAST ‘SHORT ‘0.195 ‘DEGREE] [2 ‘SCROSS ‘1.500 ‘1.500 ‘VERT ‘FAST ‘SHORT ‘0.195 ‘DEGREE] [IMAGE COMPLETE, IN W/RASTER MODE] **UNITS<CR>** [14 ‘POSITION UNITS IN VOLTS]

Section 3, SCL System Commands (continued)

SCL Command	*<Parameters>* **[Valid Text Entries or Valid Numeric Range]**	*Description*	*Example* **[Reply]**
ZERo	<X voltage> [Numeric - TBD] <Y voltage> [Numeric - TBD]	The ZERO command is used to determine the centerpoint of both the raster and stroke displays. The CENTER command, below, will offset the center of the raster display relative to the center of the stroke display.	*Note: Without parameters, the ZERO command will return the currently set center of both the stroke and raster displays.* **ZERO<CR>** [ZERO ‘numeric X voltage - TBD ‘numeric Y voltage - TBD] *Note: To set the centerpoint of both the stroke and raster displays, enter the X and Y voltage parameters with the ZERO command.* **ZERO .503 -.705<CR>** [07 ‘ZERO OK]

SE 1450 Stroke Generator Status Codes

Successful Status Codes

00 = ‘PATTERN OK [Successful Return for SLINE, SCROSS, SPATCH, ADD, EDIT commands.]
01 = ‘DELETE OK [Successful Return for DELETE command.]
02 = ‘SAVE OK [Successful Return for SAVE command.]
03 = ‘LOAD OK [Successful Return for LOAD command.]
04 = ‘RASTER ON OK [Successful Return for RASTER ON command.]
05 = ‘RASTER OFF OK [Successful Return for RASTER OFF command.]
06 = ‘CORNER OK [Successful Return for CORNER command.]
07 = ‘ZERO OK [Successful Return for ZERO command.]
08 = ‘CENTER OK [Successful Return for ZERO command.]
09 = ‘BIT COMPLETED, CHECK STATUS [Successful Return for BIT command.]
10 = ‘INTERNAL TEST OK [Successful Return for ISTATUS command.]
11 = ‘TOTAL TEST OK [Successful Return for TSTATUS command.]
12 = ‘IMAGE COMPLETE, IN SYMBOL MODE [Successful Return for READ or SREAD]
13 = ‘IMAGE COMPLETE, IN W/RASTER MODE [Successful Return for READ or SREAD]
14 = ‘POSITION UNITS IN DEGREES [Successful Return for UNITS command]
15 = ‘POSITION UNITS IN VOLTS [Successful Return for LTV command]
17 = ‘LEADER TV ONLY ON, HUD NOT REQUIRED [Successful Return for LTV command]
18 = ‘LEADER TV ONLY OFF, HUD REQUIRED
19 = ‘ADJUST OK [Successful Return for load ADJUST command]

Unsuccessful or Incomplete Status Codes

20 = ‘BAD COMMAND [First 3 characters entered not recognized as valid - All commands.]
21 = ‘PARTIAL PATTERN, SYNTAX ERROR
[Text parameter not valid in SLINE, SCROSS, SPATCH, ADD, EDIT commands - valid parameters to the left of the first invalid parameter will be processed and default values substituted from the invalid parameter forward.]
22 = ‘PARTIAL PATTERN, INPUT OUT-OF-RANGE
[Numeric parameter not valid in SLINE, SCROSS, SPATCH, ADD, EDIT commands - valid parameters to the left of the first invalid parameter will be processed and default values substituted from the invalid parameter forward.]
23 = ‘NO ADD, > MAX PATTERN NUMBER
[Only 31 generating lines may be contained in the Current Work Area. This status code indicates an attempt to add more than 31 lines with the ADD command.]
24 = ‘NO ADD, BAD COMMAND
[The first parameter of the ADD command in not recognized as a valid pattern generating command. Note: If the first parameter of the ADD command is a valid pattern generating command, however one of the parameters of the pattern generating command is invalid, a status code of 21 or 22 , above, will be returned.]
25 = ‘NO EDIT, BAD PATTERN NUMBER
[The first parameter of the EDIT command must reflect a valid line entry in the Current Work Area. Use the READ command to view valid line entries in the Current Work Area.]

Unsuccessful or Incomplete Status Codes (continued)

26 = ‘NO EDIT, BAD COMMAND
[The second parameter of the EDIT command is not recognized as a valid pattern generating command. Use the READ command to view valid line entries in the Current Work Area.].
27 = ‘RASTER ON, SWITCH CONTROLLED
[The RASTER OFF command was entered correctly, however conditions are such that the raster cannot be turned off through software control and remains on after the RASTER OFF command is issued. **Note: This only used with Spectron supplied stand alone HUD Test Bench Components, see RASTER OFF command, above.**]
28 = ‘RASTER OFF, SWITCH CONTROLLED
[The RASTER ON command was entered correctly, however conditions are such that the raster cannot be turned on through software control and remains off after the RASTER ON command is issued. **Note: This only used with Spectron supplied stand alone HUD Test Bench Components, see RASTER ON command, above.**]
29 = ‘NO DELETE, BAD PATTERN NUMBER
[The first parameter of the DELETE command must reflect a valid line entry in the Current Work Area. Use the READ command to view valid line entries in the Current Work Area.]
30 = ‘NO SAVE, BAD IMAGE NUMBER
[The line commands in the Current Work Area may be saved in EEPROM in one of 20 numbered locations. Attempts to SAVE outside of the numbered range 1 - 20 will result in this status return and the contents of the Current Work Area will not be saved.]
31 = ‘NO LOAD, BAD IMAGE NUMBER
[Attempts to LOAD data from outside of the numbered range 1 - 27 will result in this status return and the contents of the Current Work Area will Not be replaced.]
32 = ‘NO LOAD, NO IMAGE DATA
[Attempts to LOAD data from a valid image data storage area that contains no data will result in the return of this status code and the contents of the Current Work Area will not be replaced.
33 = ‘NO READ, NO IMAGE DATA
[The READ command displays the contents of the Current Work Area. If no data is present, this status code will be returned.]
34 = ‘CORNER NOT INPUT, SYNTAX ERROR
[If CORNER command is issued with parameters, both numeric parameters must be entered. Entering only 1 numeric parameter, or entering text in one of the parameters will result in the return of this status code.]
35 = ‘CORNER NOT INPUT, OUT OF RANGE
[Syntax of the CORNER command is correct, however one or both numeric parameters is out of the permissible range.]
36 = ‘CENTER NOT INPUT, SYNTAX ERROR [see CORNER, Status Code 34, above.]
37 = ‘CENTER NOT INPUT, OUT OF RANGE [see CORNER, Status Code 35, above.]
38 = ‘ZERO NOT INPUT, SYNTAX ERROR [see CORNER, Status Code 34, above.]
39 = ‘ZERO NOT INPUT, OUT OF RANGE [see CORNER, Status Code 35, above.]

Unsuccessful or Incomplete Status Codes (continued)

40 = ‘NO SAVE, EEPROM NOT PRESENT [Failed connection or EEPROM failure]
41 = ‘NO LOAD, EEPROM NOT PRESENT [Failed connection or EEPROM not present]
42 = ‘IMAGE TRUNCATED, IN SYMBOL MODE [Complete series of pattern generating commands in the current work area cannot be displayed, see *General Command Format Notes, above.]*
43 = ’IMAGE TRUNCATED, IN W/RASTER MODE [Complete series of pattern generating commands in the current work area cannot be displayed, see *General Command Format Notes, above.]*
44 = ‘SYM CMD &/OR DU BUSY NOT PRESENT [Required signals from HUD not present resulting in failed output of READ or SREAD commands.]
45 = ‘RS170 VIDEO NOT PRESENT [Required RS170 signal to HUD not present resulting in failed output from READ or SREAD commands.]
46 = ‘HIGH LOAD, ADJUST STILL MADE [The load from the HUD and associated connections is at least 10 times the expected load, but within the capability of the SE 1450 Stroke Generator to compensate with the ADJUST command.]
47 = ‘LOAD ADJUST ERROR, DEFAULT VALUES INPUT [The load from the HUD and associated connections is outside the calibration capability of the SE 1450 Stroke Generator adjustment and default values for the load will be used.]
48 = ‘ISTATUS FAIL, RERUN BIT BEFORE REPAIR [If returned after several BIT attempts, indicates failure of the SE 1450 Stroke Generator.]
49 = ‘ISTATUS FAIL, CHECK PWR SUPPLY [If returned after a new BIT, indicates a Test Station cable problem, a Power Supply problem, or a SE 1450 Stroke Generator failure.]
50 = ‘TSTATUS FAIL, RERUN BIT BEFORE REPAIR [If returned after several BIT attempts, indicates failure of the SE 1450 Stroke Generator.]
51 = ‘TSTATUS FAIL, CHECK PWR SUPPLY [If returned after a new BIT, indicates a Test Station cable problem, a Power Supply problem, or a SE 1450 Stroke Generator failure.]
52 = TSTATUS FAIL, EXT INPUTS NOT PRESENT [If received after BIT is rerun, use SREAD command to generate Status Codes 44 or 45, above, to pinpoint the failure.