



# Application Note

## *Using an External Program to Control The SF1000*

### *Applicable Products*

SF1000
SF100E
SF800
SF800E

## **Description**

The Signal Forge 1000 (SF1000) comes with an embedded control application which allows complete control of the device without the need to write any code or install any client-based software. However, some customers prefer to operate the SF1000 programmatically using an external application. This application note describes how to use an external control file to operate the SF1000.

## **Overview**

The Wave Manager software, which is installed onboard the SF1000, is an embedded, menu-driven application which is used to configure and modify the SF1000 operation. Wave Manager uses keyboard-driven menus so to operate the SF1000 using an external program or test controller, you must simply emulate the keystrokes as if you were manually traversing the Wave Manager menus. A sequence of keystrokes may be stored in a control file and sent to the SF1000 using a serial communication utility such as HyperACCESS, or using an external test control device and sent to the SF1000 over its RS-232 interface.

## **Creating a Control File**

The SF1000's keyboard input method uses a one-to-one mapping from keystrokes to characters: for each keystroke (which corresponds to a menu selection or numeric value), one character is generated.

Control files may contain an entire sequence of keyboard characters, such as the series of keystrokes needed to configure the SF1000 for a specific output type, frequency, and modulation, or they may contain a limited set of characters as needed to modify operating parameters (such as changing the frequency or power) during operation.

While control files may be stored as an ASCII text file, you will need a hex editor to convert keystrokes such as ESC and RETURN into ASCII characters.

NOTE: A delay of 250ms is required after each character. Some serial communication utilities, such as HyperACCESS, can insert the character delay for you.

Suggested Hex editors include: Codewrite ([www.borland.com.tr/tr/products/codewright/index.html](http://www.borland.com.tr/tr/products/codewright/index.html)) and Hex-editor XVI32 ([www.chmaas.handshake.de/delphi/freeware/xvi32/xvi32.htm](http://www.chmaas.handshake.de/delphi/freeware/xvi32/xvi32.htm)).

## Sending the Control File to the SF1000

Hilgraeve's HyperACCESS ([www. Hilgraeve.com](http://www.Hilgraeve.com)) is an easy to use, Windows-compatible program which may be used to transfer control files to the SF1000 since it automatically inserts the 250ms character delay.

To use HyperACCESS:

1. Connect your computer to the SF1000 using a serial cable.
2. Start HyperACCESS
3. Set the transfer properties (rate, Xon/Xoff) under P)roperties C)ommunications.
4. Configure the character delay of 250ms. You can set the character delay under P)roperties C)ommunications A)scii sending.
5. Select "text" as the file transfer protocol
6. Start transfer

## External Controller

Since all SF1000 commands are one keystroke, configuration and control may be automated by connecting it to an external controller which supports serial communication.

The controller just needs to send ASCII characters in a sequence that emulates the keystrokes that a user would enter when configuring or controlling the SF1000 manually. Note: the controller must also be able to insert the 250ms character delay discuss above.

## Examples

To configure the SF1000 to output a waveform with the following characteristics

- RF output (AC-coupled)
- Single tone
- Frequency: 900 MHz
- Power: 5 dBm

Your script would contain the following character sequence:

Keystroke	Description/Comment
ESC<pause>	Two escapes ensures your are at the top menu level
ESC<pause>	
C<pause>	Waveform creation menu
C<pause>	New waveform type
A<pause>	Single tone
A<pause>	Edit parameters
A<pause>	Output
A<pause>	AC coupled output
B<pause>	Frequency
900000000<pause>	Sets frequency to 900 MHz
ENTER<pause>	Enter accepts value
O<pause>	dBm base power select
D<pause>	Lowers dbm by 1 (default is +7)
D<pause>	Lowers dbm by 1 (default is +7)
ENTER<pause>	Enter accepts value
ESC<pause>	Returns to previous menu
D	Run waveform

## Sample Control File

A sample control file may be downloaded from our web site

[http://www.signalforge.com/home/sf1/smartlist\\_11/Application\\_Notes.html](http://www.signalforge.com/home/sf1/smartlist_11/Application_Notes.html)

## Modifying Waveforms “On the Fly”

While the above waveform is running, you may change the frequency or power. For example, to change the frequency 900 MHz to 150 MHz your controller would send the following sequence in ASCII Text:

```
A<pause>
F<pause>
150000000<pause>
ENTER
```

## ASCII Table

Dec	Hx	Oct	Char	Dec	Hx	Oct	Htmi	Chr	Dec	Hx	Oct	Htmi	Chr	Dec	Hx	Oct	Htmi	Chr
0	0	000	<b>NUL</b> (null)	32	20	040	Space	64	40	100	0	96	60	140	0	96	60	140
1	1	001	<b>SOH</b> (start of heading)	33	21	041	!	65	41	101	A	97	61	141	0	97	61	141
2	2	002	<b>STX</b> (start of text)	34	22	042	"	66	42	102	B	98	62	142	0	98	62	142
3	3	003	<b>ETX</b> (end of text)	35	23	043	#	67	43	103	C	99	63	143	0	99	63	143
4	4	004	<b>EOT</b> (end of transmission)	36	24	044	\$	68	44	104	D	100	64	144	0	100	64	144
5	5	005	<b>ENQ</b> (enquiry)	37	25	045	%	69	45	105	E	101	65	145	0	101	65	145
6	6	006	<b>ACK</b> (acknowledge)	38	26	046	&	70	46	106	F	102	66	146	0	102	66	146
7	7	007	<b>BEL</b> (bell)	39	27	047	'	71	47	107	G	103	67	147	0	103	67	147
8	8	010	<b>BS</b> (backspace)	40	28	050	(	72	48	110	H	104	68	150	0	104	68	150
9	9	011	<b>TAB</b> (horizontal tab)	41	29	051	)	73	49	111	I	105	69	151	0	105	69	151
10	A	012	<b>LF</b> (NL line feed, new line)	42	2A	052	*	74	4A	112	J	106	6A	152	0	106	6A	152
11	B	013	<b>VT</b> (vertical tab)	43	2B	053	+	75	4B	113	K	107	6B	153	0	107	6B	153
12	C	014	<b>FF</b> (NP form feed, new page)	44	2C	054	,	76	4C	114	L	108	6C	154	0	108	6C	154
13	D	015	<b>CR</b> (carriage return)	45	2D	055	-	77	4D	115	M	109	6D	155	0	109	6D	155
14	E	016	<b>SO</b> (shift out)	46	2E	056	.	78	4E	116	N	110	6E	156	0	110	6E	156
15	F	017	<b>SI</b> (shift in)	47	2F	057	/	79	4F	117	O	111	6F	157	0	111	6F	157
16	10	020	<b>DLE</b> (data link escape)	48	30	060	0	80	50	120	P	112	70	160	0	112	70	160
17	11	021	<b>DC1</b> (device control 1)	49	31	061	1	81	51	121	Q	113	71	161	0	113	71	161
18	12	022	<b>DC2</b> (device control 2)	50	32	062	2	82	52	122	R	114	72	162	0	114	72	162
19	13	023	<b>DC3</b> (device control 3)	51	33	063	3	83	53	123	S	115	73	163	0	115	73	163
20	14	024	<b>DC4</b> (device control 4)	52	34	064	4	84	54	124	T	116	74	164	0	116	74	164
21	15	025	<b>NAK</b> (negative acknowledge)	53	35	065	5	85	55	125	U	117	75	165	0	117	75	165
22	16	026	<b>SYN</b> (synchronous idle)	54	36	066	6	86	56	126	V	118	76	166	0	118	76	166
23	17	027	<b>ETB</b> (end of trans. block)	55	37	067	7	87	57	127	W	119	77	167	0	119	77	167
24	18	030	<b>CAN</b> (cancel)	56	38	070	8	88	58	130	X	120	78	170	0	120	78	170
25	19	031	<b>EM</b> (end of medium)	57	39	071	9	89	59	131	Y	121	79	171	0	121	79	171
26	1A	032	<b>SUB</b> (substitute)	58	3A	072	:	90	5A	132	Z	122	7A	172	0	122	7A	172
27	1B	033	<b>ESC</b> (escape)	59	3B	073	;	91	5B	133	[	123	7B	173	0	123	7B	173
28	1C	034	<b>FS</b> (file separator)	60	3C	074	<	92	5C	134	\	124	7C	174	0	124	7C	174
29	1D	035	<b>GS</b> (group separator)	61	3D	075	=	93	5D	135	]	125	7D	175	0	125	7D	175
30	1E	036	<b>RS</b> (record separator)	62	3E	076	>	94	5E	136	^	126	7E	176	0	126	7E	176
31	1F	037	<b>US</b> (unit separator)	63	3F	077	?	95	5F	137	_	127	7F	177	0	127	7F	177

Source: [www.LookupTables.com](http://www.LookupTables.com)