

***VOICECRAFTER™***  
***And VOICECRAFTER Plus***  
**Echo Canceling Audio System**  
**RS-232 Control Manual**

**advantage** ®

## **INTRODUCTION**

This manual documents the control commands for the *VOICECRAFTER* Series products. This manual is designed to be used by those trying to control or write remote control programs for the *VOICECRAFTER*.

## **SERIAL INTERFACE AND DATA COMMUNICATION PARAMETERS**

Computer control can be accomplished through the DB9 Male Control Port located on the rear panel of the *VOICECRAFTER* and *VOICECRAFTER Plus* units. This port is DTE format, and utilizes a standard straight through RS232 serial cable. This port operates only at 9600 baud rate and cannot be changed.

## **TYPES OF CONTROL**

The *VOICECRAFTER* supports the use of terminal emulation commands (ASCII Characters), dummy terminal emulation ('s' Commands) and advanced control ('t' Commands).

### **ASCII CHARACTERS**

All of the ASCII characters represent the same functions that are used by the SC-300 software (that operated the VC30XX series). Most ASCII commands require the use of the F2 or F3 commands to change values (See *Voicecrafter 3000 Series Operation Manual* for more details) The following table defines the ASCII characters used:

## ASCII COMMANDS

# on HHT	Command	HEX	ASCII	Command Description
1	F1 (Preset 1)	0x11	Control Q	Function 1 Key
4	F2 (Preset 2)	0x12	Control R	Function 2 Key (also up command)
7	F3 (Preset 3)	0x13	Control S	Function 3 Key (also down command)
10	F4 (Preset 4)	0x14	Control T	Function 4 Key
13	F5 (Preset 5)	0x15	Control U	Function 5 Key
16	MIC1 MUTE	0x41	A	Microphone #1 Mute
17	MIC1 GAIN	0x2b	+	Microphone #1 Gain Adjust
18	MIC1 DEFAULT	0x01	Control A	Microphone #1 Default (Training) Gain
19	MIC2 MUTE	0x42	B	Microphone #2 Mute
20	MIC2 GAIN	0x28	(	Microphone #2 Gain Adjust
21	MIC2 DEFAULT	0x02	Control B	Microphone #2 Default (Training) Gain
22	VOLUME ADJUST	0x43	C	Loudspeaker User Volume Adjustment
23	AERL TARGET	0x29	)	AERL Target for Training
25	DSP AVE	0x44	D	DSP Audio Level Measurements
28	SPEAKER MUTE	0x45	E	Loudspeaker Mute
29	SPEAKER VOL	0x3e	>	Loudspeaker Gain Adjust
31	RECALL PROFILE	0x46	F	Recall a stored configuration file.
32	STORE PROFILE	0x2D	-	Store a configuration file in memory.
33	ERASE PROFILE	0x06	Control F	Erase a stored configuration file.
34	TRAIN	0x47	G	Train the Voicecrafter 3000
37	2W Hook	0x48	H	Activate or deactivate the Two-Wire Interface
40	SW VERSION	0x49	I	Display Software Version & Serial Number
43	ALARM LED	0x4A	J	Alarm Display / Acoustic EC ASIC Test
45	BAUD CHANGE	0x0A	Control J	DB9M RS-232 Port Baud Rate Adjust
46	4W #1 IN	0x4b	K	Four-Wire #1 Input Gain
47	4W #2 IN	0x2f	/	Four-Wire #2 (Aux) Input Gain Adjust
48	4W #1 TLP	0x0B	Control K	Four-Wire #1 Input Gain Offset Adjustment
49	4W #1 OUT	0x4c	L	Four-Wire #1 Output Gain
50	4W #2 OUT	0x26	&	Four-Wire #2 (Aux) Output Gain Adjust
51	4W #2 MODE	0x0C	Control L	Four-Wire #2 (Aux) Operation Mode
52	MIC2 MODE	0x4D	M	Microphone #2 Input Mode Selection (Mic/Line)
55	VCR MUTE	0x4E	N	Four-Wire #2 (Aux) Input Mute / VCR Mute
56	PRIVACY	0x3B	;	System Mute (Privacy) Enable/Disable
57	PRIVACY MODE	0x0E	Control N	Privacy Mute Option Control
58	NLP ADJUST NEAR	0x4F	O	Near End Noise Floor Adjustment
59	NLP ADJUST FAR	0x3F	?	Far End Noise Adjustment
61	MIC LOOP	0x50	P	Microphone Loopback
62	4W LOOP	0x2a	*	Four Wire Loopback
64	BANDWIDTH	0x51	Q	Loudspeaker Bandwidth Narrow/Wide
67	2W RCV	0x34	4	Two-Wire Interface Receive Gain Adjustment
70	NOISE	0x52	R	White Noise Generator Enable/Disable
73	NLP	0x53	S	Non Linear Processor Enable/Disable
79	SENDEC4	0x54	T	EC ASIC Transmit Level Average Measurement
80	SNDLEVEL	0x5E	^	Autoadaptaion Transmit Level Average
82	RCVEC4	0x55	U	EC ASIC Receive Level Average Measurement
83	RCVLEVEL	0x24	\$	Display Autoadaptaion Receive Level Average
94	HREGUNCLEAR	0x58	X	Acoustic EC ASIC H-Register Clear/Unclear
95	CANCELLER	0x2E	.	Cancellation Enable/Disable
100	Auto Adapt	0x22	"	Autoadaptation Function
105	SYSTEM RESET	0x08	Control H	System Reset Key (Press TRAIN first)

**s-Commands**

The 's' commands (used by the UC-300 User Control Console and TTC Table Top Controller) allows limited control of functions without making any permanent changes to the Voicecrafter configuration settings. Each s-Command consists of a start byte (lower case 's') followed by two command bytes (also lower case letters), but not followed by a carriage return. Each of the s-Commands will generate a response from the Voicecrafter. The response packet consists of two ASCII characters.

**s-Commands**

COMMAND	HEX	ASCII	RESPONSE
Volume increase	73 67 7A	s g z	"OB" "HB" if Volume Limit
Volume decrease	73 68 7A	s h z	"FB" "HB" if Volume Limit
VCR volume increase	73 71 67	s q g	"OC" "HC" if Volume Limit
VCR volume decrease	73 71 68	s q h	"FC" "HC" if Volume Limit
Mute all microphones	73 69 61	s i a	"FPFQ"
UnMute all mics	73 69 62	s i b	"OPOQ"
System mute	73 69 6A	s i j	"HV"
System UnMute	73 69 6C	s i l	"FV"
VCR mute on	73 71 6A	s q j	"O["
VCR mute off	73 71 6C	s q l	"F["
Toggle Mic 1 Mute	73 61 7A	s a z	"FP" Mic Muted "OP" Mic UnMuted
Toggle Mic 2 Mute	73 62 7A	s b z	"FQ" Mic Muted "OQ" Mic UnMuted
Mic loopback on	73 6B 63	s k c	"OE"
Mic loopback off	73 6B 64	s k d	"FE"
4 wire loopback on	73 6B 65	s k e	"OD"
4 wire loopback off	73 6B 66	s k f	"FD"
Wideband select	73 6A 63	s j c	"OG"
Narrowband select	73 6A 64	s j d	"FG"
Train	73 6D 6F	s m o	"HG" Training Started "HI" Training Completed
Noise Source Enable	73 61 64	s a d	"OI"
Noise Source Disable	73 62 64	s b d	"FI"
Speaker Mute	73 69 67	s i g	"FS"
Speaker UnMute	73 69 68	s i h	"OS"
System Mute Toggle	73 69 7A	s i z	"HV" if Muted "FV" if UnMuted
VCR Mute Toggle	73 71 7A	s q z	"O[" if Muted "F[" if UnMuted
Connect Two Wire	73 6A 6D	s j m	"OW" if connected
Hang-up Two Wire	73 6C 6D	s l m	"FW"

**DTMF 's' Commands**

DTMF dialing will not send a response to a PC or system controller.

<b>Command</b>	<b>HEX Bytes</b>	<b>ASCII Bytes</b>
Dial '1'	0x73 0x63 0x6C	scl
Dial '2'	0x73 0x64 0x6C	sdl
Dial '3'	0x73 0x65 0x6C	sel
Dial 'A'	0x73 0x66 0x6C	sfl
Dial '4'	0x73 0x63 0x6D	scm
Dial '5'	0x73 0x64 0x6D	sdm
Dial '6'	0x73 0x65 0x6D	sem
Dial 'B'	0x73 0x66 0x6D	sfm
Dial '7'	0x73 0x63 0x6E	scn
Dial '8'	0x73 0x64 0x6E	sdn
Dial '9'	0x73 0x65 0x6E	sen
Dial 'C'	0x73 0x66 0x6E	sfn
Dial '*'	0x73 0x63 0x6F	sco
Dial '0'	0x73 0x64 0x6F	sdo
Dial '#'	0x73 0x65 0x6F	seo
Dial 'D'	0x73 0x66 0x6F	sfo
Hook Flash	0x73 0x63 0x70	scp
Hold Two Wire	0x73 0x6B 0x6D	skm

**\*\*NOTE** – DTMF tones can not be heard unless the DTMF Mix is enabled using 't' commands (See page 10 of this document.) or via PC control via BiampWin. To enable DTMF Mix in BiampWin, click on the DTMF Mix box located in the 2-wire section of the control software.

## **t-Commands**

't' commands are designed to be used by third-party controllers for complete control of the *VOICECRAFTER* Series product. Changes made via 't' commands are made via the lower DB9 Male port, and are designed to allow a controller to change the value of a specific configuration parameter to a specific value. Any t-Command received by the *VOICECRAFTER* will generate a response that indicates the current setting of the parameter specified after the change. The 't' commands can also be used to request the status of one or more configuration parameters.

### **t-Command Format**

The 't' command format is: **txxyyyzz**.

't' - Start byte that tells the Voicecrafter what type of command to expect.

'xx' - Defines the configuration to be changed. 8bit HEX value 00 ~ FF.

'yyyy' – Specifies the value for the configuration to be changed to, or specifies a status request for a parameter. 16 bit HEX value 0000 ~ FFFF.

'zz' - is the 8 bit checksum (in HEX) of the ASCII string "txxyyy".

### **t-Command Response**

There are two types of responses to a 't' command:

'J' response indicates that the 't' command entered was valid and contains the response to the 't' command. The information contained in the 'J' response depends on whether the 't' command was a value change, or a status request. In either case the 'J' response is in the same format as the 't' commands (Jxxyyyzz).

'K' response indicates that the 't' command entered was invalid. If the 't' command contains proper characters, but has an incorrect checksum, the 'K' response will be the same as the 't' command sent, except the proper checksum will be added. The proper 't' command can then be executed using the correct checksum value. The Voicecrafter will ignore any incorrect 't' commands except those containing an incorrect checksum

**'t' Commands**

Description	Command (XX)	Possible Values (yyyy)	
Status Request	0x00	0x0000 - 0x00FF	Causes a status dump of one or all configuration variable values in the 'J' response format. If yyyy is '0000', then a full status dump results. Otherwise the status of configuration variable yyyy will be reported. I.e. Status of Mic 1 default gain would be: t000001zz.
MIC 1 Default Gain	0x01	0xFFFA - 0x000C	MIC 1 Default Gain used by configuration train to set MIC 1 Gain. Valid range -6dB - +12dB in 2's compliment.
MIC 2 Default Gain	0x02	0xFFFA - 0x000C	MIC 2 Default Gain used by configuration train to set MIC 2 Gain. Valid range -6dB - +12dB in 2's compliment.
Erase Configuration	0x06	0x0001 - 0x0005	Erase from: 0001 = location 1 0002 = location 2 0003 = location 3 0004 = location 4 0005 = location 5
Codec Rx Gain Offset	0x0B	0xFFF4 - 0x000C	Center point of Codec input automatic gain control Valid range: -12dB - +12dB in 2's compliment
Auxiliary Port Mode	0x0C	0x0000 - 0x0001	0x0000 = Bridge Mode 0x0001 = VCR mode
Convergence	0x18	0x0000 - 0x0001	Echo cancellation convergence enable/disable Enable = 0x0001 Disable = 0x0000
Production Mode	0x19	0x0001	Initialize production test mode
Autoadaptation	0x22	0x0000 - 0x0001	Autoadaptation enable/disable Enable = 0x0001 Disable = 0x0000
VCR Output Gain	0x26	0xFFF4 - 0x000C	VCR/AUX Output Gain Valid Range: -12dB - +12dB in 2's compliment
MIC2 Gain	0x28	READ ONLY	Mic 2 Input Gain. Valid Range: -6dB - +12dB in 2's compliment.
Train AERL	0x29	0x0000 - 0x00C8	AERL target used by Configuration Train. Format is in dB times 10 (2's compliment) Range 0dB - +20dB
4-Wire Loopback	0x2A	0x0000 - 0x0003	0x0000 = loopback disabled 0x0001 = Codec Input/Output Loopback 0x0002 = Aux Input/Output Loopback 0x0003 = Codec and Aux Both Loopback
MIC1 Gain	0x2B	READ ONLY	Mic 1 Input Gain - Valid Range: -6dB - +12dB in 2's compliment

Store Configuration	0x2D	0x0001 - 0x0005	Store into: 0x0001 = location 1 0x0002 = location 2 0x0003 = location 3 0x0004 = location 4 0x0005 = location 5
Canceller	0x2E	0x0000 - 0x0001	Cancellation enable/disable Enable = 0x0001 Disable = 0x0000
VCR Input Gain	0x2F	0xFFFF4 - 0x000C	VCR/Aux input Gain. Valid Range: -12dB - +12dB in 2's compliment
System Mute	0x3B	0x0000 - 0x0001	System mute (privacy) enable/disable Mute = 0x0001 UnMute = 0x0000
Loudspeaker Gain	0x3E	READ ONLY or 0xFFA7 - 0x0006	Speaker Output Gain. Format is in 2's compliment. Valid range if Autoadaption is disabled: -89dB - +6dB.
MIC1 Mute	0x41	0x0000 - 0x0001	Mute = 0x0001 UnMute = 0x0000
MIC2 Mute	0x42	0x0000 - 0x0001	Mute = 0x0001 UnMute = 0x0000
User Volume	0x43	0x0001 or 0xFFFF	User Volume Control: Setting a value of 0x0001 raises user volume by 1dB. Setting a value of 0xFFFF lowers user volume by 1dB. The response to this t- command will be the actual user volume value in 2's compliment.
DSP Average	0xFC	READ ONLY: 0x0001 - 0x0008	Read DSP calculated averages (Read in 2's Compliment) 0x0001 = EC_Si (Rms) 0x0002 = EC_So (Rms) 0x0003 = EC_Ri (Rms) 0x0004 = NLP_So (Rms) 0x0005 = Codec In Rms 0x0006 = AERL 0x0007 = ERLE 0x0008 = VCR In (Rms)
Loudspeaker Mute	0x45	0x0000 - 0x0001	Mute = 0x0001 UnMute = 0x0000
Recall Configuration	0x46	0x0000 - 0x0005	Recall from: 0x0001 = location 1 0x0002 = location 2 0x0003 = location 3 0x0004 = location 4 0x0005 = location 5
Alarm Indication	0x4A	READ ONLY	16-bit alarm indicator
Codec Rx Gain	0x4B	READ ONLY	Codec Input AGC Gain value in 2's compliment. Range = -12dB - +12dB)



4- Wire Output Gain	0x4C	0xFFF4 - 0x000C	Codec Output Gain. Valid Range: -12dB - +12dB in 2's compliment
VCR Input Mute	0x4E	0x0000 - 0x0001	VCR input mute enable/disable Mute = 0x0001 UnMute = 0x0000
Microphone Loopback	0x50	0x0000 - 0x0003	Microphone loopback enable/disable: 0x0000 = loopback disabled 0x0001 = Microphone 1 Loopback 0x0002 = Microphone 2 Loopback 0x0003 = Mic 1 & Mic 2 Loopback
White Noise	0x52	0x0000 - 0x0001	White noise generator enable/disable Enable = 0x0001 Disable = 0x0000
NLP	0x53	0x0000 - 0x0001	Nonlinear processor enable/disable Enable = 0x0001 Disable = 0x0000
H-REG Clear	0x58	0x0000 - 0x0001	Acoustic EC5 H-register clear/unclear Unclear = 0x0001 Clear = 0x0000
Train	0x59	0x0000 - 0x0001	Initiate Voicecrafter training sequence 0x0000 = Refresh Train 0x0001 = Configuration Train
Alarm Latch	0x5D	READ ONLY	16-bit latched alarm indicator
MIC 2 Mode Select	0x4D	0x0000 - 0x0001	Microphone 2 mode select: 0x0000 = Microphone level input 0x0001 = Line level input (unbalanced) 0x0002 = Line level input (balanced)
SW Version	0x72	READ ONLY	CPU software version; the format = 0xaabb, where the aa position indicates released software version, and the bb position indicates experimental (beta) software version. For example, 0x0100 indicates released software version 1.00.
AERL	0xA2	READ ONLY	AERL reading from last configuration train, times 10dB in 2's compliment format.
ERLE	0xA3	READ ONLY	ERLE reading from last configuration train, times 10dB in 2's compliment format.
Configuration Reset	0xF1	0x0001	Setting this parameter to a 0x0001 will cause the RAM of the Voicecrafter to be initialized to the Factory Default values.
Train MIC 1 Gain	0xA7	0xFFFA - 0x000C	This parameter is programmed by the DSP when a Configuration Train is executed. Setting this parameter will determine the Mic 1 Gain that will be loaded when the Voicecrafter performs a Refresh Train. This parameter (and all gain values) are represented as 2's compliment HEX numbers. Range = -6dB - +12dB

Train Mic 2 Gain	0xA8	0xFFFA - 0x000C	This parameter is normally programmed by the DSP when a Configuration Train is executed. Setting this parameter will determine the Mic 2 Gain that will be loaded when the Voicecrafter performs a Refresh Train. This parameter (and all gain values) are represented as 2's compliment HEX numbers. Range = -6dB to +12dB
Train Speaker Gain	0xA9	0xFFA7 - 0x0006	This parameter is normally programmed by the Configuration Train program as the Loudspeaker Gain is adjusted to match the AERL TARGET parameter. Setting this parameter will determine the Loudspeaker Gain that will be loaded when the Voicecrafter performs a Refresh Train. This parameter (and all gain values) are represented as 2's compliment HEX numbers. Range = -89dB - +6dB
Noise Gate Attenuation	0xE9	0xFFD0 - 0x0000	This parameter determines the maximum amount of attenuation that is applied when the Noise Gate becomes active. This parameter is represented as 2's compliment HEX number. The valid range for this parameter is 0dB through -48dB.
Noise Gate Threshold	0xF4	0xFFA7 - 0xFFFF6	This parameter determines the maximum signal level that the Noise Gate will block. This parameter defaults to -89dB, which disables the Noise Gate. The valid range for this parameter is -10dB through -89dB.
Noise Gate Hold Time	0xF5	0x0000 0x0010	This parameter determines the amount of time that the transmit audio level must fall below the Noise Gate Threshold before the Noise Gate becomes active. The valid range for this parameter is 0 through 16 seconds.
Noise Gate Decay Time	0xF6	0x0001 0x0010	This parameter determines the amount of time that elapses before the Noise Gate reaches full attenuation (as defined by Noise Gate Attenuation). The valid range for this parameter is 0.5 through 8 seconds (adjustable in 0.5 second intervals).
Talker State	0xEB		This is a READ ONLY parameter that indicates the Talker State of the Voicecrafter. This indicator can be used when the conferencing system requires a status of near end vs. far end talker status.
		0x0000	Returns a zero value to indicate an idle condition. The speech detectors are not detecting a significant speech level in the receive or transmit directions.
		0x0001	The speech detectors are indicating a near end speech condition.
		0x0002	The speech detectors are indicating a far end speech condition.
		0x0003	The speech detectors are indicating a double talk speech condition.
2 Wire Hook	0x48		Writing to this parameter controls the 2-Wire Interface:
		0x0000	Sets the 2-Wire Interface On Hook or Off Line. (HANG UP)
		0x0001	Off Hook or Online (CONNECT)
		0x0002	Mutes the 2-Wire Interface (HOLD)
UC-300 Mode	0x21	0x0000	Novice Mode. Advanced UC-300 Commands are disabled (MIC1+MIC2 = Configuration Train)
		0x0001	Expert Mode. Enables Advanced commands from the UC-300.

DTMF Mix	0xEC	0x0000	Setting this parameter to zero disables the DTMF Mix feature.
		0x0001 - 0xFFFF	Setting this parameter to a non-zero value enables the DTMF Mix Feature. Any DTMF tones generated will be audible in the conference mix.
DTMF Pause	0xED	0x0010 - 0x0100	This parameter controls the length of the pause that is inserted between sequential DTMF digits during dialing.
DTMF Duration	0xEE	0x0010 - 0x0100	This parameter controls the length of the DTMF tone generated for each digit dialed.
DTMF Attenuation	0xEF	0xFF00 - 0xFFFFD	This parameter controls the signal level of the DTMF tones that are generated and transmitted to the 2-Wire Interface. The value 0xFFFFD sets the DTMF level to maximum. The value 0xFF00 sets the DTMF level to the minimum. Each step between the maximum and minimum is a 6dB increment.
Dial Mode	0xF0	0x0000	Setting this parameter to zero will set the Voicecrafter dialing mode to DTMF dialing.
		0x0001 - 0xFFFF	Setting this parameter to any non-zero value sets the Voicecrafter dialing mode to Pulse Dialing mode.
BTV Mode	0xEA	0x0000	Setting this parameter to zero disables the BTV Mode feature.
		0x0001	Setting this parameter to 0x0001 will put the Voicecrafter into the BTV CENTRAL mode. This will cause the 2-Wire Transmit port to be muted. It will also prevent the 2-Wire Receive audio from being re-transmitted to the Codec Transmit port.
		0x0002	Setting this parameter to 0x0002 will put the Voicecrafter into the BTV REMOTE mode. This will prevent the Codec Receive Audio from being re-transmitted to the 2-Wire Interface.

**T-Command Status Request Format**

The first variable transmitted in response to a t-Command status request will be variable zero (xx=00). The value of this variable will indicate the number of variables that will be sent by the Voicecrafter following this first packet. For example the packet: "J0000036D J0100016C J0202006E J03012373"  
 (NOTE: Spaces are added for readability.)

Indicates that three variables are being transmitted, and the values are:

Variable #	Value
01	001
02	0200

03	0123
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