CONNECT SYSTEMS INCORPORATED

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FLEX SERIES UNIVERSAL CONTROLLER

FLEX IIIA CTCSS COMMUNITY TONE PANEL

User's Instruction Manual

Made in U.S.A.

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GENERAL DESCRIPTION

The FLEX SERIES COMMUNITY TONE PANEL by Connect Systems Inc. is a handles both CTCSS and DCS. A built-in LCD digital display allows the user to obtain the maximum power from the on-board microprocessor. All features are user programmable and/or selectable.

Powerful built in standard features make this FLEX Series Universal Controller the best deal going in CTCSS/DCS Communication Controllers today!

SETTING EVERTHING BACK TO FACTORY DEFAULT

If for some reason it is necessary to set the system back to factory default, plug a computer into the front of the unit and enter the command "F1" or "CNTRL + [" using Hyperterminal or some other terminal emulation program. The Com port should be set for 2400 baud, 8 bits, no parity, 1 stop bit, and no flow control.

If you do not want to attach a computer, then insert the shorting block on JP 5. Turn on the power, remove JP 5 shorting block, and observe the display will go through the following steps:

- INITIALIZING CTCSS EEPROM
- INITIALIZING DCS EEPROM
- INITIALIZING LTR EEPROM
- INITIALIZING GLOBAL EEPROM

GETTING INTO PROGRAMMING MODE

This product allows the user to get into programming mode from either the radio if enabled or a computer if using Connect Systems Window Based program. If using a radio, use ##123456## where "123456" is the default access code. To get out of the programming mode use the command "####".

DIFFERENT PROGRAMMING AREAS USED

This product uses the following programming areas:

CTCSS
DCS
REPEATER

GETTING ADDITIONAL INFORMATION

The web site at www.connectsystems.com has additional manuals for this product. These manuals should be used in conjunction with this manual.

OVERVIEW

The Flex IIIA CTCSS Series Community Tone Panel is a sophisticated Controller for use on systems using CTCSS tones or DCS codes. The Flex IIIA CTCSS Series Tone Panel provides up to 112 DCS users and 51 CTCSS users.

The CSI panels with a front panel LCD display keeps you totally informed about repeater and system status while you are at the repeater site. User tones and codes and other useful data are constantly displayed.

Another unique feature is the ability to set levels remotely. Most other panels require you to be at the site and take the repeater out of the rack. This panel allows you to change levels thousands of miles away.

A CLOSER LOOK

Hardware Connection

In the FLEX IIIA CTCSS, the CTCSS/DCS subtone and voice AUDIO both come off the rear removable connector. The CTCSS/DCS subtone is on pin 7 and voice AUDIO is on pin 4.

Dispatch Logic Unit

The Flex IIIA CTCSS Series Community Tone Panel decodes and encodes DCS data and CTCSS data to and from the mobile units and controls audio paths.

Validator

The built-in validator will only allow access to mobiles with enabled enabled CTCSS tones or DCS codes.

CONNECTING THE FLEX IIIA TO YOUR RADIO

For optimal use, use shielded wiring for all connections and make sure to connect all shields to GND. Most installations do not require shielded wiring. The removable plug is connected to J3.

Name	Pin	Description
GND	1,3	Connect to the ground of the power supply.
+12 VDC	2	Connect to the 12-15 VDC of the power supply.
TX AUD:	4	Connect to the transmitter voice input.
TX KEY	5	Connect to the transmitter PTT line.
RX DET	6	Connect to the receiver discriminator output.
TX SUB	7	Connect to the transmitter modulator input.
RX COS	8	Connect to the COS /COR of the receiver.
--------	9	Unused connection
--------	10	Unused connection
Sense 1	11	Unused connection
--------	12	Unused connection

INSTALLATION PROCEDURES

Set each FLEX IIIA CTCSS controller you get to factory default by pressing **123456** from a radio or hyperterminal. Alternatively you can install jumper 5 and then turn on power. Take out jumper after controller is initialized

1. Connect the removable 12-pin connector attached to the repeater to the FLEX IIIA controller assigned as the master.

2. Use Diagnostic modes specified in the next page to adjust various programmable parameters. Remember to always use repeater 1 when programming.

3. Connect each Flex IIIA controller to its designated repeater using the removable connecter.

4. Adjust all pots for proper levels in the FLEX IIIA CTCSS unit using the diagnostic modes or other methods of your choosing.

5. Program the controller as needed for your application.

6. If still having problems call Connect Systems Inc at (805) 642-7184 for technical assistance.

DIAGNOSTIC MODES

There are two special diagnostic modes for this product.

Diagnostic Mode 1

By putting a jumper into JP5, the system will allow the user to determine the value to set the SENSE and COS inputs as well as adjust the squelch pot if COS is not used. When in this mode, the display will look as follows:

```
---------------------------------
|S|Q|U|E| | |C|O|S| | |S|E|N|S|E|
---------------------------------
|O|F|F| | | |1|3|7| | | |2|3|5| |
---------------------------------
```

The user then generates a high and low value for either the COS or Sense input and watches the display. The value for the trigger voltage for the appropriate parameter is a value between the two points.

The squelch pot is used for proper adjustment of the “SQUE”. The results will be either on or off.

Diagnostic Mode 2

By putting a jumper into JP4 before power turn on, the system will allow the user to determine if the system is decoding DTMF properly. The bottom line of the display will be used for decoding DTMF tones from the radio.

CTCSS PROGRAMMING AREA

The CTCSS programming area is used to program parameters where the CTCSS tone is of importance. As an example, the command *1001#670#03#1# is used to turn on a user with a tone of 67 hertz on repeater 1.

The general form of this area is *1001#nnn#... where the 1 indicates the area is CTCSS and the nnn corresponds to a valid CTCSS number as shown in table 1. If the nnn has a value of 999, then gang programming is used and the 51 different CTCSS users will have the same value programmed.

As an example, if you want to turn off all the CTCSS users use the command *1001#999#03#0#. The 1 indicates it's a CTCSS field, the 999 indicates it's a gang programming command, the 03 indicates its an enable/disable user field, and the 0 indicates the user should be disabled.

TABLE OF CTCSS TONES AND THE CORRESPONDING USER VALUES

CTCSS TONE	USER VALUE	CTCSS TONE	USER VALUE
63.0 *	630	156.7	156
67.0	670	159.8 *	159
69.4 *	694	162.2	162
71.9	719	165.5 *	165
74.4	744	167.9	167
77.0	770	171.3 *	171
79.7	797	173.8	173
82.5	825	177.3 *	177
85.4	854	179.9	179
88.5	885	183.5 *	183
91.5	915	186.2	186
94.8	948	189.9 *	189
97.4	974	192.8	192
100.0	100	196.6 *	196
103.5	103	199.5 *	199
107.2	107	203.5	203
110.9	110	206.5 *	206
114.8	114	210.7	210
118.8	118	218.1	218
123.0	123	225.7	225
127.3	127	229.1 *	229
131.8	131	233.6	233
136.5	136	241.8	241
141.3	141	250.3	250
146.2	146	254.1 *	254
151.4	151		

TABLE 1

* non standard tones

DCS PROGRAMMING AREA

The DCS programming area is used to program parameters where the DCS code is of importance. As an example, the command *2023#03#1# is used to turn on user with a code of 023.

The general form of this area is *2nnn#... where the 2 indicates the area is DCS and the nnn corresponds to a valid DCS number as shown in table 2. If the nnn has a value of 999, then gang programming is used and the 112 different DCS users will have the same value programmed.

As an example, if you want to turn off all the DCS users, use the command *2999#03#0#. The 2 indicates it's a DCS field, the 999 indicates it's a gang programming command, the 03 indicates its an enable/disable user field, and the 0 indicates the user should be disabled.

TABLE OF DCS CODES

DCS CODE	DCS CODE	DCS CODE
006 *	172	431
007 *	174	432
015 *	205	445
017 *	212 *	446 *
021 *	214 *	452 *
023	223	454 *
025	225 *	455 *
026	226	462 *
031	243	464
032	244	465
036 *	245	466
043	246 *	503
047	251	506
050 *	252 *	516
051	255 *	523 *
053 *	261	526 *
054	263	532
065	265	546
071	266 *	565
072	271	606
073	274 *	612
074	306	624
114	311	627
115	315	631
116	325 *	632
122 *	331	654
125	332 *	662
131	343	664
132	346	703
134	351	712
141 *	356 *	723
143	364	731
145 *	365	732
152	371	734
155	411	743
156	412	754
162	413	
165	423	

TABLE 2

* non standard codes

NORMAL / INVERSE DCS CODES

DCS	INVERSE	DCS	INVERSE	DCS	INVERSE
006	021	172	036	431	723
007	214	174	074	432	516
015	141	205	263	445	043
017	050	212	356	446	255
021	006	214	007	452	053
023	047	223	134	454	266
025	244	225	122	455	332
026	464	226	411	462	252
031	627	243	351	464	026
032	051	244	025	465	331
036	172	245	072	466	662
043	445	246	523	503	162
047	023	251	165	506	073
050	017	252	462	516	432
051	032	255	446	523	246
053	452	261	732	526	325
054	413	263	205	532	343
065	271	265	156	546	132
071	306	266	454	565	703
072	245	271	065	606	631
073	506	274	145	612	346
074	174	306	071	624	632
114	712	311	664	627	031
115	152	315	423	631	606
116	754	325	526	632	624
122	225	331	465	654	743
125	365	332	455	662	466
131	364	343	532	664	311
132	546	346	612	703	565
134	223	351	243	712	114
141	015	356	212	723	431
143	412	364	131	731	155
145	274	365	125	732	261
152	115	371	734	734	371
155	731	411	226	743	654
156	265	412	143	754	116
162	503	413	054		
165	251	423	315		

TABLE 3

CWID FIELD

Certain fields such as fields that require the user to enter in CWID characters or names require letters and numbers. Being that the radio keypad has only 10 numbers, a method has to be used to accommodate all the letters, special characters, and numbers with only ten numeric keys. This is accomplished by pressing two numeric keys for each letter. As the user enters the second key, the display will show the equivalent letter, special character, or number. The table to accomplish this is shown below.

CHAR	VALUE	CHAR	VALUE	CHAR	VALUE	CHAR	VALUE
A	00	Z	25	y	50	-	75
B	01	a	26	z	51	+	76
C	02	b	27	0	52	=	77
D	03	c	28	1	53	{	78
E	04	d	29	2	54	}	79
F	05	e	30	3	55	[	80
G	06	f	31	4	56	]	81
H	07	g	32	5	57	|	82
I	08	h	33	6	58	;	83
J	09	i	34	7	59	:	84
K	10	j	35	8	60	<	85
L	11	k	36	9	61	>	86
M	12	l	37	`	62	,	87
N	13	m	38	~	63	.	88
O	14	n	39	!	64	?	89
P	14	o	40	@	65	/	90
Q	16	p	41	#	66	sp	91
R	17	q	42	$	67	sp	92
S	18	r	43	%	68	sp	93
T	19	s	44	^	69	sp	94
U	20	t	45	&	70	sp	95
V	21	u	46	*	71	sp	96
W	22	v	47	(	72	sp	97
X	23	w	48	)	73	sp	98
Y	24	x	49	_	74	sp	99

TABLE 4

GLOBAL PROGRAMMING AREA

Programming Parameters	TO PROGRAM	TO DISPLAY
	V	V
REPEATER NUMBER	***0000#01#01#**	***0000#01***
NOT USED IN THIS PRODUCT BUT MUST BE SET TO 1		
SITE NUMBER	***0000#02#NN#**	***0000#02***
NOT USED IN THIS PRODUCT BUT MUST BE SET TO 1		

CTCSS PROGRAMMING AREA

Programming Parameters	TO PROGRAM	TO DISPLAY
	↓	↓
COURTESY BEEP J = 1 = Enabled, J = 0 = Disabled	***1001#NNN#01#J#**	***1001#NNN#01*** Default = 0
CTCSS/DCS DURING HANG TIME J = 1 = Enabled, J = 0 = Disabled	***1001#NNN#02#J#**	***1001#NNN#02*** Default = 1
SUBSCRIBER ENABLE/DISABLE J = 1 = Enabled, J = 0 = Disabled It allows enabling or disabling specific tones or codes.	***1001#NNN#03#J#**	***1001#NNN#03*** Default = 1
RESERVE TONE J = 1 = Enabled, J = 0 = Disabled If a subscriber tone/code is turned enabled and reserve tone is enabled, the repeater will come up, but no audio will pass.	***1001#NNN#04#J#**	***1001#NNN#04*** Default = 0
NETWORK MODE **NOT USED IN THIS PRODUCT**	***1001#NNN#05#J#**	***1001#NNN#05***
MAPPED NETWORK USER NUMBER **NOT USED IN THIS PRODUCT**	***1001#NNN#06#MMM#**	***1001#NNN#06***

DCS PROGRAMMING AREA

Programming Parameters	TO PROGRAM	TO DISPLAY
	V	V
COURTESY BEEP J = 1 = Enabled, J = 0 = Disabled	***2001#NNN#01#J#**	***2001#NNN#01*** Default = 0
CTCSS/DCS DURING HANG TIME J = 1 = Enabled, J = 0 = Disabled	***2001#NNN#02#J#**	***2001#NNN#02*** Default = 1
SUBSCRIBER ENABLE/DISABLE J = 1 = Enabled, J = 0 = Disabled It allows enabling or disabling specific tones or codes.	***2001#NNN#03#J#**	***2001#NNN#03*** Default = 1
RESERVE TONE J = 1 = Enabled, J = 0 = Disabled If a subscriber tone/code is turned enabled and reserve tone is enabled, the repeater will come up, but no audio will pass.	***2001#NNN#04#J#**	***2001#NNN#04*** Default = 0
NETWORK MODE **NOT USED IN THIS PRODUCT**	***2001#NNN#05#J#**	***2001#NNN#05***
MAPPED NETWORK USER NUMBER **NOT USED IN THIS PRODUCT**	***2001#NNN#06#MMM#**	***2001#NNN#06***

LTR PROGRAMMING AREA

Programming Parameters	TO PROGRAM	TO DISPLAY
	V	V
COURTESY BEEP **NOT USED IN THIS PRODUCT**	***3001#III#01#J#**	***3001#III#01***
SUBSCRIBER ENABLE/DISABLE **NOT USED IN THIS PRODUCT**	***3001#III#02#J#**	***3001#III#02***
NETWORK MODE **NOT USED IN THIS PRODUCT**	***3001#NNN#03#J#**	***3001#NNN#03***
MAPPED NETWORK NUMBER **NOT USED IN THIS PRODUCT**	***3001#NNN#04#MMM**	***3001#NNN#04***

REPEATER PARAMETER AREA

	TO PROGRAM	TO DISPLAY
	V	V

Programming Parameters

TELCO PROGRAMMING ***8001#01#J#** ***8001#01***
NOT USED IN THIS PRODUCT

RADIO PROGRAMMING ***8001#02#J#** ***8001#02***
J = 0 = Disabled J = 1 = Enabled Default = 1
When enabled, the controller will allow the parameters to be programmed by radio. If disabled, the controller will ignore any attempt to program the parameters via radio.

PHONE PROGRAMMING ***8001#02#J#** ***8001#02***
NOT USED IN THIS PRODUCT

COMPUTER PROGRAMMING ***8001#04#J#** ***8001#04***
J = 0 = Disabled J = 1 = Enabled Default = 1
When enabled, the controller will allow the parameters to be programmed by a computer plugged into the RS232 port in the front of the controller. If disabled, the controller will ignore any attempt to program the parameters via a computer plugged into the front of the controller.

PROGRAMMING MODE ACCESS CODE ***8001#05#NNNNNN#** ***8001#05***
NNNNNN = 000000 - 999999 Default 123456
Code must be precisely six digits. This code is used to enter the programming mode from all sources.

Level Control

DTMF TELCO LEVEL ***8001#06#MMM#** ***8001#07***
NOT USED IN THIS PRODUCT

DTMF RADIO LEVEL ***8001#07#MMM#** ***8001#07***
NOT USED IN THIS PRODUCT

BEEP RADIO LEVEL ***8001#08#MMM#** ***8001#08***
MMM = 0 - 255 Default = 50
This is the level annunciating beeps will be heard over the radio.

BEEP TELCO LEVEL ***8001#09#MMM#** ***8001#09***
NOT USED IN THIS PRODUCT

CW ID RADIO LEVEL ***8001#10#MMM#** ***8001#10***
MMM = 0 - 255 Default = 50
It is the level for Morse code station identification over the radio.

VOICE RADIO LEVEL ***8001#11#MMM#** ***8001#11***
NOT USED IN THIS PRODUCT

VOICE TELCO LEVEL ***8001#12#MMM#** ***8001#12***
NOT USED IN THIS PRODUCT

PAGING TONE RADIO LEVEL ***8001#13#MMM#** ***8001#13***
NOT USED IN THIS PRODUCT

CTCSS RADIO LEVEL ***8001#14#MMM#** ***8001#14***
NOT USED IN THIS PRODUCT. CTCSS POT IS USED FOR ADJUSTMENT.

DCS RADIO LEVEL ***8001#15#MMM#** ***8001#15***
NOT USED IN THIS PRODUCT. DCS POT IS USED FOR ADJUSTMENT.

LTR RADIO LEVEL ***8001#16#MMM#** ***8001#16***
NOT USED IN THIS PRODUCT

REPEAT RADIO LEVEL ***8001#17#MMM#** ***8001#17***
NOT USED IN THIS PRODUCT. USE PREAMP AND AUDIO OUT POTS.

TELCO RADIO LEVEL ***8001#18#MMM#** ***8001#18***
NOT USED IN THIS PRODUCT

RADIO TELCO LEVEL ***8001#19#MMM#** ***8001#19***
NOT USED IN THIS PRODUCT

RADIO LIMIT LEVEL ***8001#20#MMM#** ***8001#20***
NOT USED IN THIS PRODUCT. USE PREAMP AND AUDIO OUT POTS.

COS/SQUELCH Parameters

COS OR INTERNAL SQUELCH ***8001#21#J#** ***8001#21***
J = 1 = INTERNAL SQUELCH, J = 0 = COS DEFAULT = 0
It selects the source of the squelch.

COS POLARITY SELECT ***8001#22#J#** ***8001#22***
J = 1 = positive, J = 0 = negative Default = 0
If set for a positive voltage, then any voltage above the COS Trigger Voltage will set COS true. If it set for a negative voltage, then any voltage below the COS trigger voltage will set COS true. There is a one half volt hysterises built in.

COS TRIGGER VOLTAGE ***8001#23#MMM#** ***8001#23***
MMM = 0 - 255 Default = 45
This is the trigger point that will cause the COS to be active. See diagnostic mode 2 to set the COS trigger voltage.

COS ACQUISITION TIME ***8001#24#MM#** ***8001#24***
MM = 0 - 99 in 1 millisecond increments Default = 0

This parameter is the time COS must be valid before the system will consider the signal is valid. This is to prevent noise from triggering the system.

COS RELEASE TIME ***8001#25#MM#** ***8001#25***
MM = 0 - 99 in 10 millisecond increments Default = 10
This parameter is the time COS must be invalid before the system will consider the signal no longer valid. This is to prevent picket fence signals from distorting the system.

Sense Parameters

SENSE POLARITY SELECT ***8001#26#J#** ***8001#26***
J = 1 = positive, J = 0 = negative Default = 1
If set for a positive voltage, then any voltage above the SENSE Trigger Voltage will set SENSE true. If set for a negative voltage, then any voltage below the SENSE trigger voltage will set SENSE true. There is a one half volt hysterises built in.

SENSE TRIGGER VOLTAGE ***8001#27#MMM#** ***8001#27***
MMM = 0 - 255 Default = 128
This is the trigger point that will cause the SENSE to be active. See diagnostic mode 2 to set the sense trigger voltage.

SENSE ACQUISITION TIME ***8001#28#MM#** ***8001#28***
MM = 0 - 99 in 1 millisecond increments Default = 0
This parameter is the time SENSE must be valid before the system will consider the signal is valid. This is to prevent noise from triggering the system.

SENSE RELEASE TIME ***8001#29#MM#** ***8001#29***
MM = 0 - 99 in 10 millisecond increments Default = 10
This parameter is the time SENSE must be invalid before the system will consider the signal no longer valid. This is to prevent picket fence signals from distorting the system.

LTR Parameters

LTR HOLD DELAY ***8001#30#MM#** ***8001#30***
NOT USED IN THIS PRODUCT

PTT TURN OFF TIME ***8001#31#MM#** ***8001#31***
NOT USED IN THIS PRODUCT

REPEATER TIMEOUT ***8001#32#MM#** ***8001#32***
MM = 0 - 255 in 1 second increments Default = 180
This is mainly to lock out stuck mobile transmitters. This parameter is used in the Tone panel operation.

Tone Panel Parameters

ANTI-KERCHUNKING TIME ***8001#33#MM#** ***8001#33***
MM = 01-99, 0 to d isable (.1 sec/step) Default = 0
If enabled, repeater will not hang unless user keys down at least as long as the time set. Does not affect pick up speed. In increments of 100 milliseconds.

SQUELCH TAIL LENGTH ***8001#34#MM#** ***8001#34***
MM = 0-99 in Milliseconds increments Default = 0
Set to 0 for minimum tail. Only used if the receiver has a poor squelch and can stop word clipping by adding squelch delay. If there is a tail noise when set to 0, it is caused by slow squelch response in the receiver. The controller does not add any more tail than is inherent to the receivers squelch if set to 0. In increments of 1 milliseconds. Use COS Acquisition and COS Release time for this function. This COS parameters works on both the COS and internal squelch.

CTCSS/DCS HOLD DELAY ***8001#35#MM#** ***8001#35***
MM = 3-99 in 100 millisecond increments Default = 30
Use the lowest setting possible without introducing talk off. It fills the missing gap when CTCSS/DCS decoding momentarily falters due to over modulation, momentary weak signal etc.

CROSS BUSY DELAY TIME ***8001#36#MM#** ***8001#36***
NOT USED IN THIS PRODUCT

CROSS BUSY HOLD TIME ***8001#37#MM#** ***8001#37***
NOT USED IN THIS PRODUCT

LTR SYNC BIT ***8001#38#J#** ***8001#38***
NOT USED IN THIS PRODUCT

LTR Parameters

PRIORITY LEVEL ***8001#39#N#** ***8001#39***
NOT USED IN THIS PRODUCT

LTR ENCODE POLARITY ***8001#40#J#** ***8001#40***
NOT USED IN THIS PRODUCT

LTR DECODE POLARTIY ***8001#41#J#** ***8001#41***
NOT USED IN THIS PRODUCT

TEST ID CODE ***8001#42#MMM#** ***8001#42***
NOT USED IN THIS PRODUCT

IDLE MESSAGE TIMER ***8001#43#MMM#** ***8001#43***
NOT USED IN THIS PRODUCT

AREA BIT ***8001#44#J#** ***8001#44***
NOT USED IN THIS PRODUCT

MASTER OR SLAVE ***8001#45#J#** ***8001#45***
NOT USED IN THIS PRODUCT MUST BE SET TO MASTER

CTCSS/DCS Parameters

DCS ENCODE POLARITY ***8001#46#J#** ***8001#46***
0 = Normal, 1 = Inverted Default = 0
It corrects transmitted DCS Polarity.

DCS DECODE POLARTIY ***8001#47#J#** ***8001#47***
0 = Normal, 1 = Inverted Default = 0
It corrects received DCS polarity.

COURTESY TONE DELAY ***8001#48#MM#** ***8001#48***
MM 0- 99 (.01-.99 Seconds) Default = 10
Delay of courtesy beep after mobile drops his carrier. In increments of 10 milliseconds. If the courtesy tone delay is greater than the hang time, the courtesy tone will not be heard.

SUBSCRIBER HANG TIME ***8001#49#MM#** ***8001#49***
MM = 0 - 99 (0-9.9 Seconds) Default = 30
Determines how long the carrier remains on after the CTCSS/DCS drops. In increments of 100 milliseconds.

CARRIER DROP DELAY ***8001#50#MM#** ***8001#50***
MM = 00-99, (0 - .99 Seconds) Default = 99
Adjusts how long carrier remains on after CTCSS/DCS drops at end of hang time. Keeping the carrier on quiets the mobile while the mobile CTCSS/DCS decoder is dropping and allows the repeater to go off without a squelch tail heard. The default value is .99 seconds and probably will not need to be changed. In increments of 10 milliseconds

Note: The carrier drop delay is additive to hang time and in effect increases the total beyond the value set for hang time.

Common Repeater Parameters

ACCESS DELAY ***8001#51#MM#** ***8001#51***
NOT USED IN THIS PRODUCT

STATION IDENTIFICATION MODE ***8001#52#J#** ***8001#52***
J = 0 = BEACON, J = 1 = Activity Default = 0
In Beacon mode, the Station ID will go out periodically according to the interval. In Activity mode, the Station ID will go out periodically according to the interval but only if there was activity since the last transmission.

VOICE OR MORSE CODE ***8001#53#J#** ***8001#53***
NOT USED IN THIS PRODUCT. ONLY MORSE CODE IS USED.

REPEATER CW ID INTERVAL ***8001#54#MM#** ***8001#54***
MM = 01-99, 0 to disable (1-99 Minutes) Default = 0

Determines how often the system will send its call sign using voice or Morse code when the system is not in use. It is in increments of 1 minute. Zero means disabled.

CW ID SPEED ***8001#55#MM#** ***8001#55***
MM = 04-99 (Milliseconds for a DI) Default = 5 (20 WPM)
Determines how fast the Morse code will be sent. The larger the number, the slower the speed is. A DAH is three times longer than a DI.

CWID FREQUENCY ***8001#56#MM#** ***8001#56***
MM = 1 – 20 Default = 5
It sets the frequency of the Morse code per the user's preference. By having a different frequency for each repeater, the user can determine which repeater is active if they are being monitored. When "N" = 1, then the frequency is 400 Hz. Each increment of "N" increases the frequency by 100 Hz.

CWID SEQUENCE CHARACTERS ***8001#57#AAAAAAAAAA#** ***8001#57***
AAAAAAAAAA Default blank
The station call sign can consist of any letter, number, and a few special characters that can be up to 10 characters in length. Trailing blanks are ignored and any illegal character will be sent. Lower case and upper case letters can be used.

PTT TURN ON DELAY ***8001#58#MM#** ***8001#58***
MM = 0 = 99 (0 - .99 Seconds) Default = 10
It's the time to wait after keying the repeater before issuing an CTCSS tone or DCS code. This delay compensates for any key-up delay in the transmitter. In Increments of 10 milliseconds.

COURTESY BEEP FREQUENCY ***8001#59#MM#** ***8001#59***
MM = 1 – 20 Default = 5
It sets the frequency of the courtesy beep per the user's preference. By having a different frequency for each repeater, the user can determine which repeater is active if they are being monitored. When "N" = 1, then the frequency is 400 Hz. Each increment of "N" increases the frequency by 100 Hz.

REPEATER DISABLE ***8001#60#N#** ***8001#60***
N = 0 -2 Default = 0
It allows the repeater to be in special modes in case of trouble with co-channel users or other things.
0 = Normal operation
1 = Shut down like the repeater does not even exist
2 = Shut down like the repeater does not even exist

AUX RELAY ***8001#61#J#** ***8001#61***
NOT USED IN THIS PRODUCT

CROSS BUSY MODE ***8001#62#N#** ***8001#62***
NOT USED IN THIS PRODUCT

RADIO REPEATER GAIN ***8001#63#N#** ***8001#63***
NOT USED IN THIS PRODUCT. USE PREAMP AND AUDIO OUT POTS.

TELCO REPEATER GAIN ***8001#64#M#** ***8001#64***
NOT USED IN THIS PRODUCT

Networking Parameters

NETWORK HANG TIME ***8001#65#MM#** ***8001#65***
NOT USED IN THIS PRODUCT

Alarm Parameters

ALARM COUNT ***8001#66#N#** ***8001#66***
NOT USED IN THIS PRODUCT

RESTORE COUNT ***8001#67#N#** ***8001#67***
NOT USED IN THIS PRODUCT

INTERVAL ***8001#68#N#** ***8001#68***
NOT USED IN THIS PRODUCT

CODE ***8001#69#MMM#** ***8001#69***
NOT USED IN THIS PRODUCT

Interconnect Mode

INTERCONNECT ***8001#70#J#** ***8001#70***
NOT USED IN THIS PRODUCT

NETWORK INACTIVITY TIMER ***8001#71#MMM#** ***8001#71***
NOT USED IN THIS PRODUCT

FCC NOTICE TO USERS

1. This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference which may cause undesirable operation.

2. This equipment generates and uses radio frequency energy and if not installed and used properly, i.e. in strict accordance with the service manual, may cause interference to radio or television reception. It has been tested and found to comply with the limits for a Class B computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a residential installation.

3. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

   a. Reorient the receiving antenna.

   b. Relocate the equipment with respect to the receiver.

   c. Move the equipment away from the receiver.

   d. Plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.

   e. Ensure that card mounting screws, attachment connector screws, and ground wires are tightly secured.

   f. If cables not offered by this company are used with this equipment, it is suggested that you use shielded, grounded cables with in line filters, if necessary.

   g. If necessary consult your dealer service representative for additional suggestions.

4 The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. It is the responsibility of the user to correct such interference.

REVISION HISTORY

December 1, 2011,(Version 1.00) First production Release Software released as version 1.01