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FLEX SERIES UNIVERSAL CONTROLLER

FLEX IV DSP DISPATCH CONTROLLER

User's Instruction Manual

Made in U.S.A.

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Table of Content

GENERAL DESCRIPTION	8
GETTING ADDITIONAL INFORMATION	8
GENERAL OPERATION OF THE SYSTEM	9
PROGRAMMING THE FLEX IV	10
DSP PROGRAM MEMORY	10
MICROPROCESSOR PROGRAM MEMORY	10
FLASH PARAMETER PROGRAMMING	10
EEPROM PARAMETER PROGRAMMING	10
FLEX IV DSP DISPATCH HARDWARE	11
MEMORY	11
SQUELCH DETECT.....	11
ZERO CROSSING DETECTOR.....	12
LTR/DCS/CTCSS GENERATOR.....	12
CODEC	12
ETHERNET CONTROLLER.....	12
RS232 INTERFACE	12
RS422 INTERFACE	12
POWER SUPPLY	12
TEXAS INSTRUMENTS 5510 DSP	12
SILICON LABS F120 MICROPROCESSOR	12
CONNECTING FLEX IV TO YOUR NETWORK	13
CONNECTING FLEX IV TO YOUR RADIO	14
INTERCONNECTING FLEX IV AND FLEX III-A	15
CONNECTING FLEX IV TO A DIGITAL DATA SOURCE.	16
INTERNAL SCHEMATIC OF TX AUDIO	17
INTERNAL SCHEMATIC OF RX DET	18
INTERNAL SCHEMATIC OF TX SUB	19
INTERNAL SCHEMATIC OF RX COS AND SENSE	20
INTERNAL SCHEMATIC OF TX KEY	21
INTERNAL SCHEMATIC OF POWER SUPPLY	22
LEVEL CONTROLS FOR THE FLEX IV	23
CONTRAST	23
CTCSS.....	23
DCS/LTR	23
SQUELCH.....	23
PREAMP	23
SELECTED CONNECTORS AND JUMPERS	24
OVERVIEW	25
LTR BUS FOR THE FLEX IV AND FLEX IIIA CONTROLLERS	25
GLOBAL PROGRAMMING AREA	28
REPEATER NUMBER	28
SITE NUMBER.....	28

CTCSS PROGRAMMING AREA	29
COURTESY BEEP	31
CTCSS DURING HANG TIME	31
SUBSCRIBER ENABLE/DISABLE	31
RESERVE TONE	31
NETWORK MODE	31
PRIORITY LEVEL	32
SITE 0 TELCO TYPE	32
SITE 0 TELEPHONE NUMBER	32
SITE 1 REPEATER NUMBER	32
SITE 1 CODE TYPE	32
SITE 1 CODE	32
SITE 1 TELCO TYPE	33
SITE 1 TELEPHONE NUMBER	33
SITE 2 REPEATER NUMBER	33
SITE 2 CODE TYPE	33
SITE 2 CODE	33
SITE 2 TELCO TYPE	33
SITE 2 TELEPHONE NUMBER	34
SITE 3 REPEATER NUMBER	34
SITE 3 CODE TYPE	34
SITE 3 CODE	34
SITE 3 TELCO TYPE	34
SITE 3 TELEPHONE NUMBER	35
SITE 4 REPEATER NUMBER	35
SITE 4 CODE TYPE	35
SITE 4 CODE	35
SITE 4 TELCO TYPE	35
SITE 4 TELEPHONE NUMBER	35
SITE 5 REPEATER NUMBER	36
SITE 5 CODE TYPE	36
SITE 5 CODE	36
SITE 5 TELCO TYPE	36
SITE 5 TELEPHONE NUMBER	36
SITE 6 REPEATER NUMBER	36
SITE 6 CODE TYPE	37
SITE 6 CODE	37
SITE 6 TELCO TYPE	37
SITE 6 TELEPHONE NUMBER	37
SITE 7 REPEATER NUMBER	37
SITE 7 CODE TYPE	37
SITE 7 CODE	38
SITE 7 TELCO TYPE	38
SITE 7 TELEPHONE NUMBER	38

DCS PROGRAMMING AREA	39
COURTESY BEEP	40
DCS DURING HANG TIME	41
SUBSCRIBER ENABLE/DISABLE	41
RESERVE TONE	41
NETWORK MODE	41
PRIORITY LEVEL	41
SITE 0 TELCO TYPE	42
SITE 0 TELEPHONE NUMBER	42
SITE 1 REPEATER NUMBER	42
SITE 1 CODE TYPE	42
SITE 1 CODE	42
SITE 1 TELCO TYPE	42
SITE 1 TELEPHONE NUMBER	43
SITE 2 REPEATER NUMBER	43

SITE 2 CODE TYPE	43
SITE 2 CODE	43
SITE 2 TELCO TYPE	43
SITE 2 TELEPHONE NUMBER	43
SITE 3 REPEATER NUMBER	44
SITE 3 CODE TYPE	44
SITE 3 CODE	44
SITE 3 TELCO TYPE	44
SITE 3 TELEPHONE NUMBER	44
SITE 4 REPEATER NUMBER	44
SITE 4 CODE TYPE	45
SITE 4 CODE	45
SITE 4 TELCO TYPE	45
SITE 4 TELEPHONE NUMBER	45
SITE 5 REPEATER NUMBER	45
SITE 5 CODE TYPE	45
SITE 5 CODE	46
SITE 5 TELCO TYPE	46
SITE 5 TELEPHONE NUMBER	46
SITE 6 REPEATER NUMBER	46
SITE 6 CODE TYPE	46
SITE 6 CODE	46
SITE 6 TELCO TYPE	47
SITE 6 TELEPHONE NUMBER	47
SITE 7 REPEATER NUMBER	47
SITE 7 CODE TYPE	47
SITE 7 CODE	47
SITE 7 TELCO TYPE	47
SITE 7 TELEPHONE NUMBER	48

LTR PROGRAMMING AREA **49**

COURTESY BEEP	49
SUBSCRIBER ENABLE/DISABLE	49
NETWORK MODE	49
PRIORITY LEVEL	49
SITE 0 TELCO TYPE	50
SITE 0 TELEPHONE NUMBER	50
SITE 1 REPEATER NUMBER	50
SITE 1 CODE TYPE	50
SITE 1 CODE	50
SITE 1 TELCO TYPE	50
SITE 1 TELEPHONE NUMBER	51
SITE 2 REPEATER NUMBER	51
SITE 2 CODE TYPE	51
SITE 2 CODE	51
SITE 2 TELCO TYPE	51
SITE 2 TELEPHONE NUMBER	52
SITE 3 REPEATER NUMBER	52
SITE 3 CODE TYPE	52
SITE 3 CODE	52
SITE 3 TELCO TYPE	52
SITE 3 TELEPHONE NUMBER	52
SITE 4 REPEATER NUMBER	53
SITE 4 CODE TYPE	53
SITE 4 CODE	53
SITE 4 TELCO TYPE	53
SITE 4 TELEPHONE NUMBER	53
SITE 5 REPEATER NUMBER	53
SITE 5 CODE TYPE	54
SITE 5 CODE	54
SITE 5 TELCO TYPE	54

SITE 5 TELEPHONE NUMBER	54
SITE 6 REPEATER NUMBER	54
SITE 6 CODE TYPE	54
SITE 6 CODE	55
SITE 6 TELCO TYPE	55
SITE 6 TELEPHONE NUMBER	55
SITE 7 REPEATER NUMBER	55
SITE 7 CODE TYPE	55
SITE 7 CODE	55
SITE 7 TELCO TYPE	56
SITE 7 TELEPHONE NUMBER	56
REPEATER PARAMETER AREA	57
Programming Access	57
PROGRAMMING MODE ACCESS CODE	57
Level Control	57
DTMF TELCO LEVEL	57
DTMF RADIO LEVEL	57
BEEP RADIO LEVEL	57
BEEP TELCO LEVEL	57
CW ID RADIO LEVEL	57
VOICE TELCO LEVEL	58
PAGING TONE RADIO LEVEL	58
REPEAT RADIO LEVEL	58
TELCO RADIO LEVEL	58
RADIO TELCO LEVEL	58
NETWORK RECEIVING HANG TIME	58
COS Parameters	59
COS OR INTERNAL SQUELCH	59
COS POLARITY SELECT	59
COS TRIGGER VOLTAGE	59
COS ACQUISITION TIME	59
COS RELEASE TIME	59
Sense Parameters	59
SENSE POLARITY SELECT	59
SENSE TRIGGER VOLTAGE	59
SENSE ACQUISITION TIME	60
SENSE RELEASE TIME	60
LTR Parameters	60
LTR HOLD DELAY	60
PTT TURN OFF TIME	60
REPEATER TIMEOUT	60
Tone Panel Parameters	60
ANTI-KERCHUNKING TIME	60
SQUELCH TAIL LENGTH	60
CTCSS/DCS HOLD DELAY	61
CROSS BUSY DELAY TIME	61
CROSS BUSY HOLD TIME	61
LTR Parameters	61
LTR SYNC BIT	61
PRIORITY LEVEL	61
LTR ENCODE POLARITY	61
LTR DECODE POLARTIY	61
TEST ID CODE	62
IDLE MESSAGE TIMER	62
AREA BIT	62

MASTER OR SLAVE	62
CTCSS/DCS Parameters	62
DCS ENCODE POLARITY	62
DCS DECODE POLARITY	62
COURTESY TONE DELAY	62
SUBSCRIBER HANG TIME	63
CARRIER DROP DELAY.....	63
Common Repeater Parameters.....	63
ACCESS DELAY.....	63
STATION IDENTIFICATION MODE	63
REPEATER CW ID INTERVAL.....	63
CW ID SPEED	63
CWID FREQUENCY	64
CWID SEQUENCE CHARACTERS	64
PTT TURN DELAY.....	64
COURTESY BEEP FREQUENCY.....	64
REPEATER DISABLE	64
AUX RELAY	64
CROSS BUSY MODE	64
RADIO REPEATER GAIN	65
TELCO REPEATER GAIN	65
Networking Parameters.....	65
NETWORK HANG TIME.....	65
Miscellaneous Parameters	65
NETWORK ACTIVITY TIME.....	65
REPEATER INDEX	66
REPEATER TYPE	66
<i>IP LOCAL AREA</i>	<i>67</i>
PRIMARY SUBNET MASK	67
PRIMARY GATEWAY	67
PRIMARY MAC ADDRESS	67
SECONDARY IP ADDRESS.....	67
SECONDARY SUBNET MASK	67
SECONDARY GATEWAY	67
SECONDARY MAC ADDRESS	68
<i>IP REMOTE AREA</i>	<i>69</i>
IP ADDRESS.....	69
IP DTMF CODE	69
IP MODE	69
IP INDEX.....	69
<i>FCC NOTICE TO USERS</i>	<i>70</i>
<i>REVISION HISTORY</i>	<i>71</i>

GENERAL DESCRIPTION

The FLEX IV DSP DISPATCH CONTROLLER by Connect Systems Inc. is a combination LTR Controller and Community Tone Panel, and Network Controller. 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. Additionally, there are four modes of operation to choose from...

1. Standard Community Tone Panel

It supports 51 CTCSS tones and 112 DCS Codes

2. Standard LTR Controller

It supports 250 Users per repeater with up to 20 repeaters in a system.

3. Combination Tone Panel and LTR Controller

It allows independent operation of both the LTR Controller and Community Tone Panel

4. Network Controller

It allows communication between multiple sites. A user at one site can speak simultaneously at multiple sites.

This product allows the user to eliminate the separate Tone Panel used in competing products and still have both a standard tone panel and a LTR controller. Plus this product is the first panel that will allow the dealer to migrate his user to a full LTR system without giving up the legacy conventional radios by allowing the users conventional radios to communicate with the users LTR radios.

Powerful built in standard features make the FLEX IV DSP DISPATCH CONTROLLER the best deal going in Networking Communication Controllers today!

GETTING ADDITIONAL INFORMATION

The Connect Systems Inc. web site at www.connectsystems.com has additional information that might help. If you get stuck, you can call the factory at (805) 642-7184.

GENERAL OPERATION OF THE SYSTEM

When the radio sends a LTR, CTCSS, or DCS signal to the FLEX IV DSP DISPATCH CONTROLLER, the following takes place.

1. The microprocessor decodes the signal and sets up the handshake to establish a normal LTR, CTCSS, or DCS conversation.
2. The microprocessor determines if the repeater number and id number is set for Network use (LTR) or if the tone is set for Network use (CTCSS) or the code is set for Network use (DCS).
3. If this is a Network call, then the microprocessor transfers the relevant information from the microprocessor to the DSP.
4. The DSP looks at its preprogrammed table to determine the destinations for the LTR, CTCSS, or DCS code received from the microprocessor.
5. The DSP puts a request to all the different sites for an LTR, CTCSS or DCS connection. One of four things can happen.
 - a. The site says the system is busy, so come back later.
 - b. If it's LTR, the site says this repeater is busy but you can try this other repeater at the site. If it's CTCSS or DCS the system cannot transfer a call.
 - c. The site says this channel is not busy and I can accept the call.
 - d. The site says this channel is in use by the same LTR, CTCSS or DCS code you are requesting so I can accept the call.
6. The DSP establishes connection with the remote site and starts to transmit and receive the VoIP data.
7. When the remote site receives and accepts a request to establish communication, the following happens:
 - a. The DSP transfers the code specified by the originating site to the microprocessor.
 - b. The microprocessor sets up the system to transmit the specified code to the radio attached.
 - c. The DSP starts to transmit and receive VoIP data.

PROGRAMMING THE FLEX IV

Programming the FLEX IV DSP CONTROLLER is unlike any other product made by Connect Systems Inc. There are four sections of memory that has to be programmed.

DSP PROGRAM MEMORY

This program memory contains the computer program that runs the DSP. This memory is located in FLASH and gets transferred to both internal ram and external ram when the system is first initialized. This program is preset by the factory when shipped and is changed only to add new features or to fix features that should have been working when you bought the unit.

MICROPROCESSOR PROGRAM MEMORY

This program memory contains the computer program that runs the microprocessor. This memory is located in the internal FLASH of the microprocessor and can be programmed either remotely or by attaching the CSI Model FLEX-M module to the connector on the printed circuit board. This program is preset by the factory when shipped and is changed only to add new features or fix features that should have been working when you bought the unit.

FLASH PARAMETER PROGRAMMING

This parameter memory is used to hold all the parameters necessary to run the system. It contains the Global parameters, CTCSS parameters, DCS parameters, LTR parameters, Repeater parameters, Local IP parameters, and Global IP parameters. It is located on the same chip but in a different location as the DSP program memory.

EEPROM PARAMETER PROGRAMMING

This parameter memory is used to hold all the parameters necessary to run the system. It contains the Global parameters, CTCSS parameters, DCS parameters, LTR parameters, and Repeater parameters.

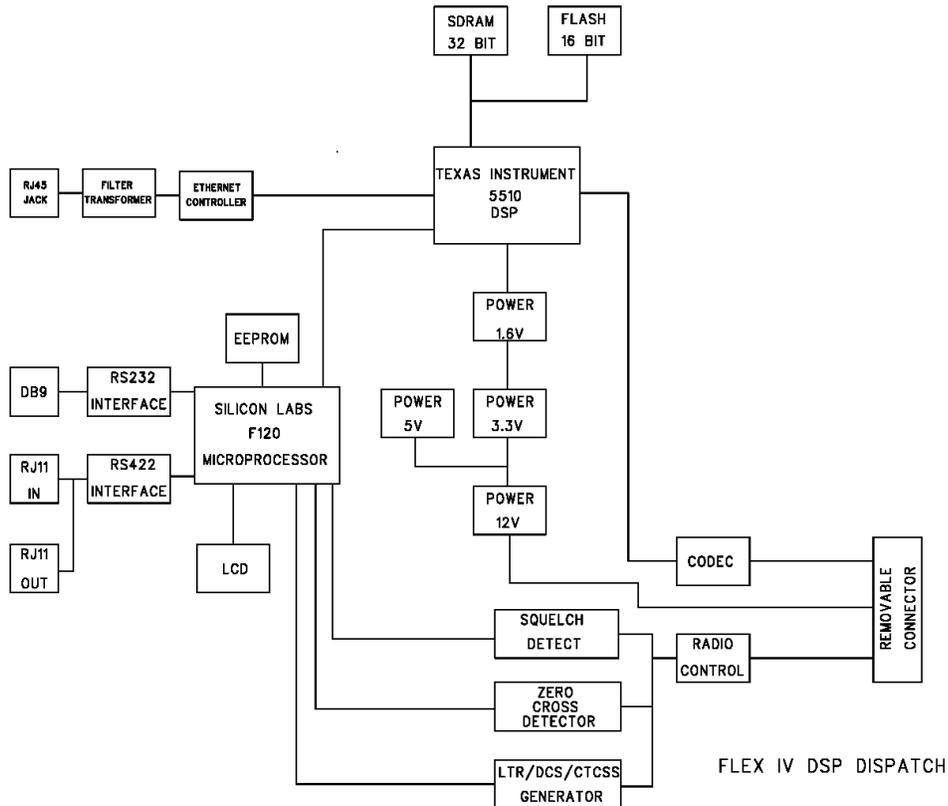
To program these different memory sections, it is necessary for the product to be connected to an IP network and the P.C. that does the programming must be able to access the product via the IP network. The P.C. programs we supply require Windows XP with Service pack 2 or later.

The details of the programs used to load the different memory sections will be in another manual.

When setting up a the system containing both FLEX IV's and FLEX III-A's, the FLEX IV must be the master.

FLEX IV DSP DISPATCH HARDWARE

The following block diagram shows the hardware design of the FLEX IV DSP DISPATCH CONTROLLER. The components within this block diagram will be referenced later so an understanding of the function is important to understanding to overall operation of the system.



MEMORY

The flash memory is used to hold parameter information for the DSP as well as programs for the DSP.

The SDRAM is used to run the programs stored in flash as well as contains storage space for various parameters and variables. It should be noted that programs and data are used for runtime operation because the speed of the SDRAM is much faster than the FLASH memory.

The EEPROM is used to hold parameter information for the microprocessor. The microprocessor contains its own on board flash memory for storage of its own computer program.

SQUELCH DETECT

The squelch detector takes the raw data from the discriminator of the radio and determines if the radio is receiving a signal.

ZERO CROSSING DETECTOR

The zero crossing detector consist of a low pass filter with a cutoff of about 250 Hz followed by a circuit that determines zero crossing of the signal coming from the discriminator. The output of the circuitry goes to the microprocessor that is used to decode the signal to extract the CTCSS, DCS or LTR codes.

LTR/DCS/CTCSS GENERATOR

The various formats are generated using technologies very similar to that employed in the CSI legacy products such as the Models LT-4200 and TP-154.

CODEC

The codec is a 16 bit A/D converter and 16 bit D/A converter and is used to pass audio signals between the radio and the DSP.

ETHERNET CONTROLLER

The Ethernet Controller connects the IP network to the DSP. It is used to receive and transmit the VOIP and digital data.

RS232 INTERFACE

The RS232 Interface is used to transmit and receive RS232 digital data.

RS422 INTERFACE

The RS422 Interface is used to allow multiple FLEX IV DSP to communicate with each other to form a local area network to allow the system to work as an LTR controller.

POWER SUPPLY

The power supply consists of both switching and linear supplies to provide a simple and efficient power supply system to power the DSP, Microprocessor, and various interface components.

TEXAS INSTRUMENTS 5510 DSP

The Texas Instruments DSP contains one of the highest performing 16 bit DSP available. Its 200 MHz speed and large internal memory allows optimum performance for VoIP and other algorithms.

SILICON LABS F120 MICROPROCESSOR

The Silicon Labs F120 microprocessor is optimized for the encoding and decoding of CTCSS, DCS, and LTR formats. Its 100 MHz speed and single cycle instruction execution is one of the highest performing 8 bit microprocessor available.

CONNECTING FLEX IV TO YOUR NETWORK

The RJ45 Jack connects directly to the users IP Network. The network can be a DSL connection to the public Internet, it can be a private network, it can be a Virtual Private Network (VPN), a wireless network such as Motorola's Canopy, or any other network that is Ethernet compatible and supports the standard Internet protocol.

There are four light emitting diodes on the board that are used for diagnostic purposes. They are as follows:

1. D15 is the RX led and it indicates the system is receiving packets from the IP network.
2. D5 is the TX led and it indicates we are sending IP packets to the IP network.
3. D14 is the LNK led and it indicates the cable is plugged into an active network.
4. D6 is the SEL led and it indicates the DSP is communicating with the Ethernet Controller.

CONNECTING FLEX IV TO YOUR RADIO

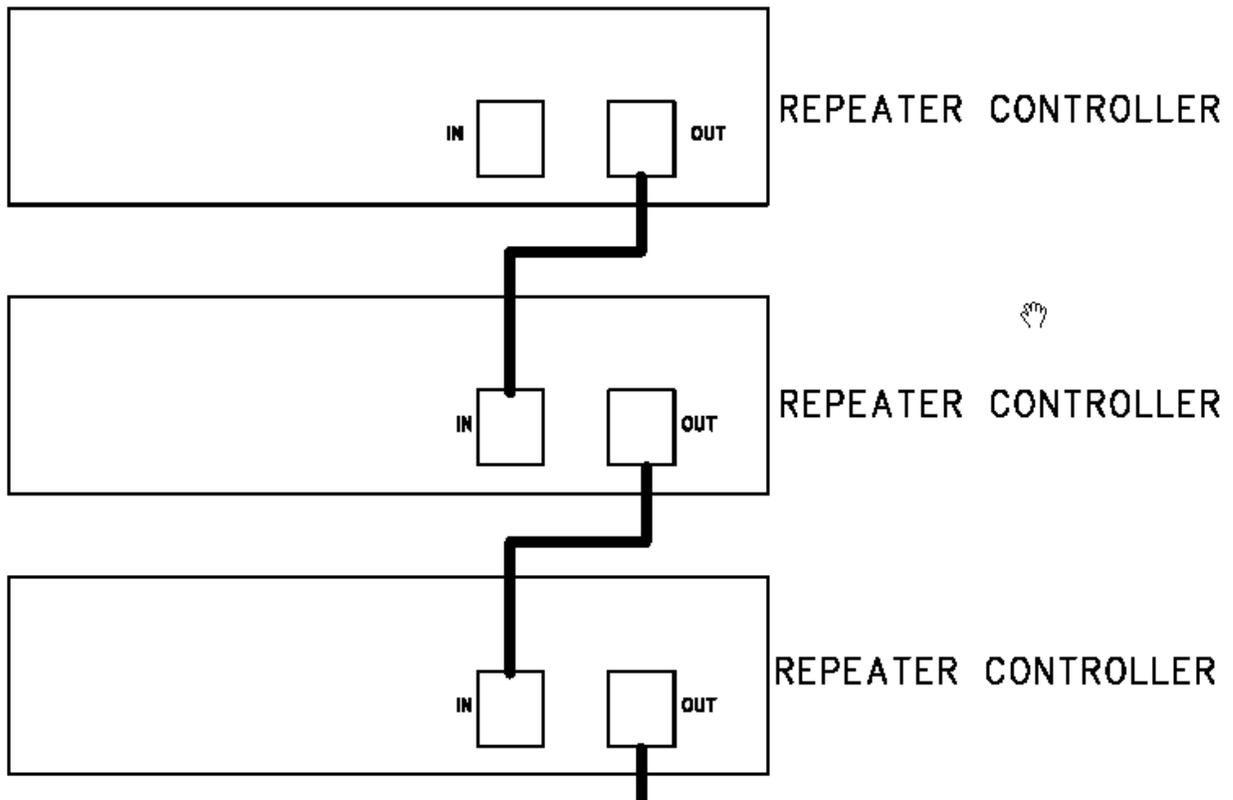
For optimal use, use shielded wiring for all connections and make sure to connect all shields to GND. Most installations do not require shielded wiring. The removable plug is connected to J8.

<u>Name</u>	<u>PIN</u>	<u>Description</u>
+12 VDC:	2	Connects to the 12-15 VDC of the power supply.
GND:	1,3	Connects to the ground of the power supply.
TX AUD:	4	Connects to the transmitter voice input.
TX KEY:	5	Connects to the transmitter PTT line.
RX DET:	6	Connects to the receiver discriminator output.
TX SUB:	7	Connects to the transmitter modulator input.
RX COS:	8	Connects to the COS /COR of the receiver.
Aux Relay:	9,10	Connects to Common and Normally open contacts of a Relay.
Sense:	11	Connects to an external Cross Busy signal.
SSB SUB:	12	Connects to the SSB demodulator output of certain radios, such as single side band model ESP1000.

INTERCONNECTING FLEX IV AND FLEX III-A

The FLEX IV DSP DISPATCH CONTROLLERS AND FLEX III-A LTR CONTROLLERS have two RJ11 jacks in the back labeled REPEATER IN and REPEATER OUT. If the system is being set up as an LTR system, the REPEATER OUT of each unit should be connected to the REPEATER IN using a daisy chain configuration. The figure below shows a pictorial representation of the connections.

This arrangement forms a local area network and allows all units to see the status of all other units. This network is also used to transfer programming information between the FLEX IV DSP DISPATCH CONTROLLER and the FLEX III-A LTR CONTROLLER(s).

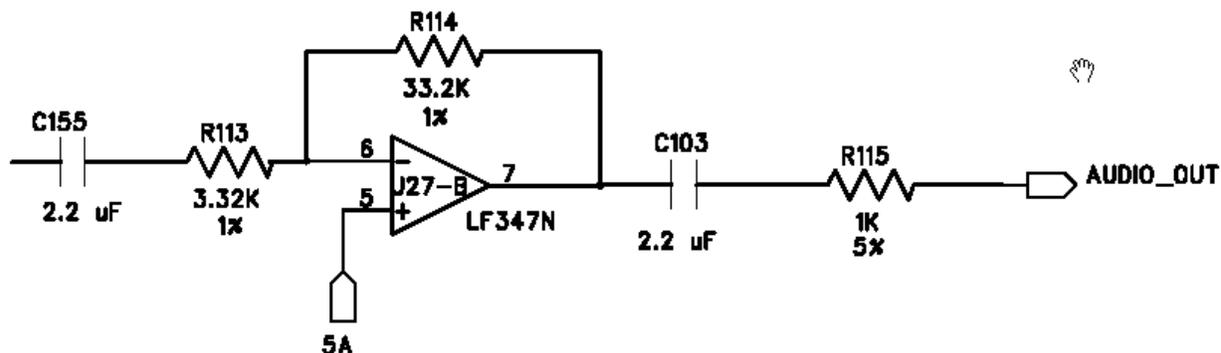


The following rule is very important: When the system consists of FLEX IV DSP units and FLEX III-A units, the master must be a FLEX IV DSP. This is necessary because the programming is done over the IP network using a PC.

Please be sure you have the proper type of RJ11 cable when connecting between two units.

INTERNAL SCHEMATIC OF TX AUDIO

For those installers who need to know the characteristics of the audio out from the FLEX IV DSP DISPATCH CONTROLLER, the following internal schematic is supplied.

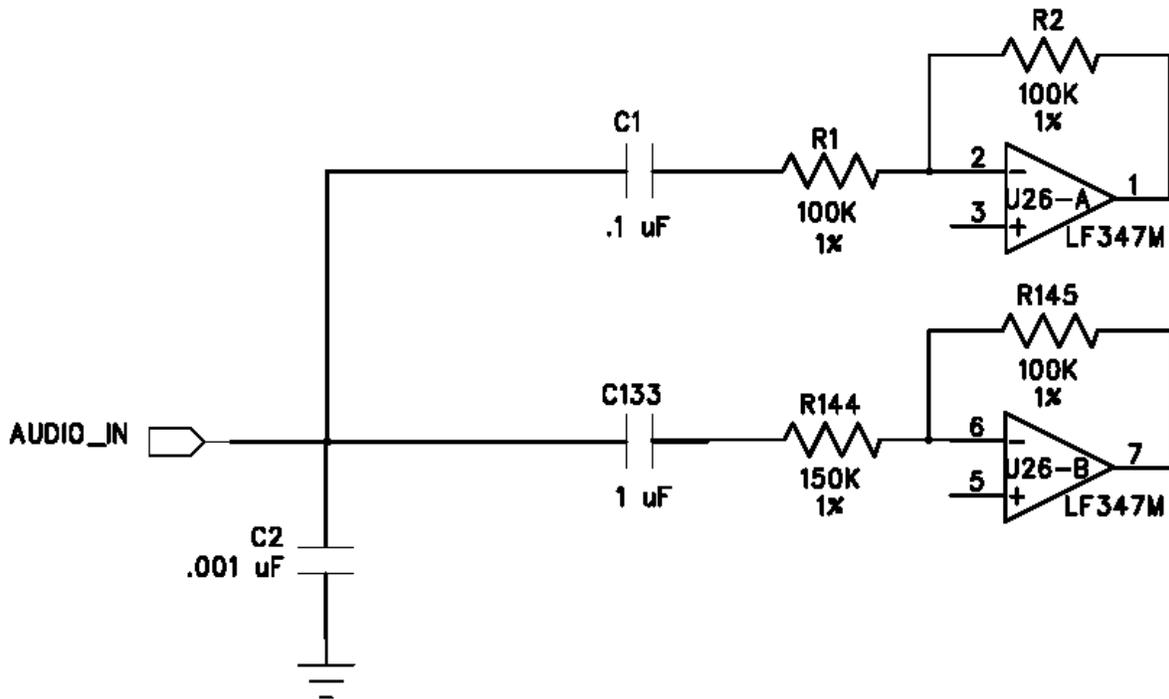


The following things should be noted.

1. The OP-AMP uses +12V for its power.
2. The output impedance is at least 1K because of the series 1K resistor.
3. Depending on the impedance of the destination device, the 2.2 uF and 1K will preclude very low frequency response.
4. TX AUDIO on the connector is called AUDIO OUT on the Schematic.

INTERNAL SCHEMATIC OF RX DET

For those installers who need to know the characteristics of the RX DET from the FLEX IV DSP DISPATCH CONTROLLER, the following internal schematic is supplied.

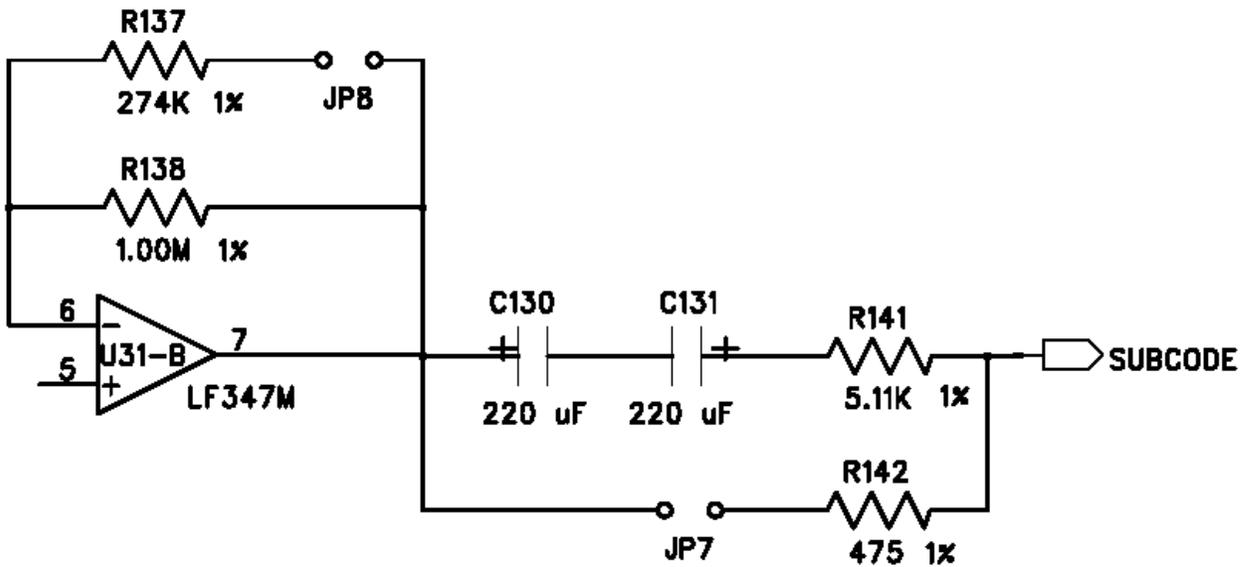


The following things should be noted.

1. The top op amp is used for processing voice audio and the bottom op amp is used for processing digital waveforms. The low frequency response of the voice audio does not have to be as low as when processing digital waveforms such as DCS or LTR.
2. This circuit represents the audio processing and is not an exact duplicate of the actual circuit because the top op amp is part of the CODEC.
3. RX DET on the connector is the same as AUDIO IN on the schematic.

INTERNAL SCHEMATIC OF TX SUB

For those installers who need to know the characteristics of the TX SUB from the FLEX IV DSP DISPATCH CONTROLLER, the following internal schematic is supplied.

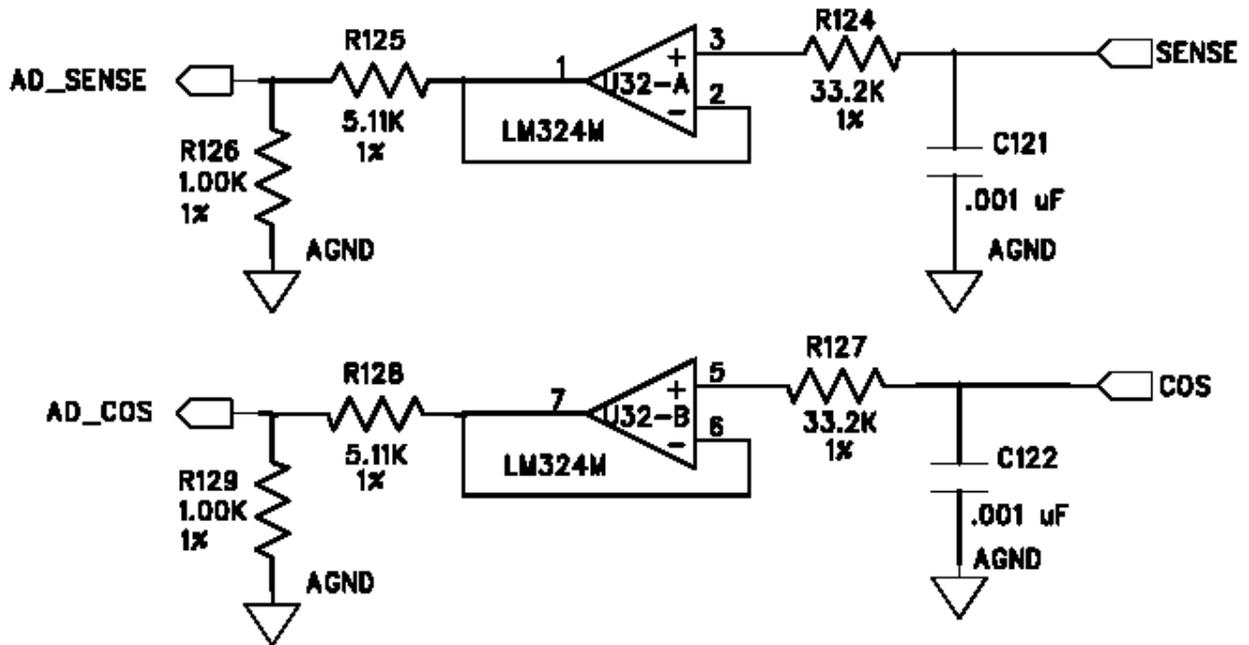


The following things should be noted.

1. TX SUB on the connector is the same as SUBCODE on the schematic.

INTERNAL SCHEMATIC OF RX COS AND SENSE

For those installers who need to know the characteristics of the RX COS and SENSE from the FLEX IV DSP DISPATCH CONTROLLER, the following internal schematic is supplied.

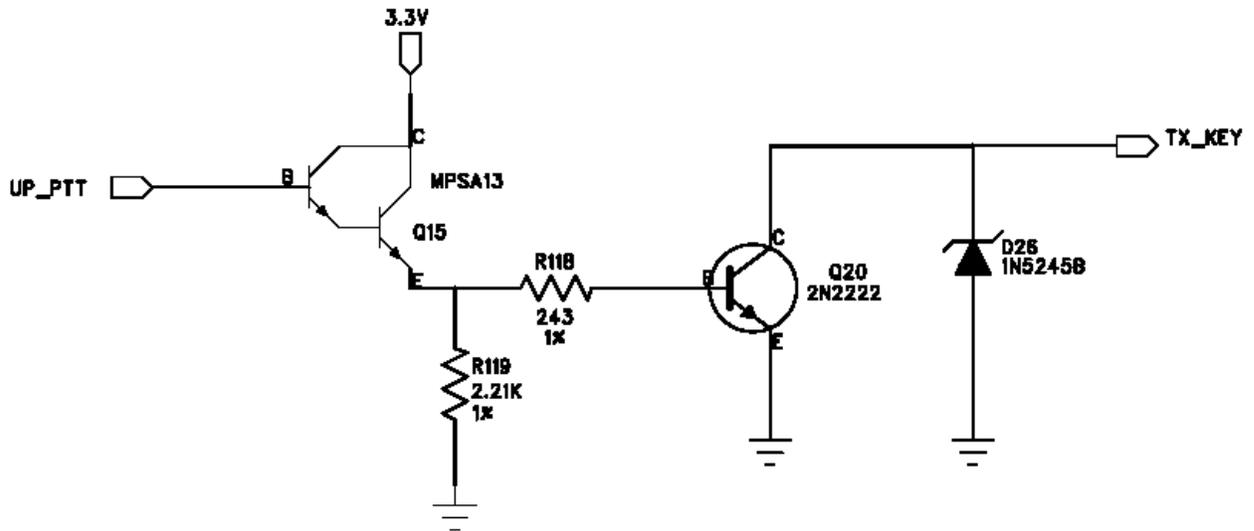


The following things should be noted.

1. TX COS on the connector is the same as COS on the schematic.

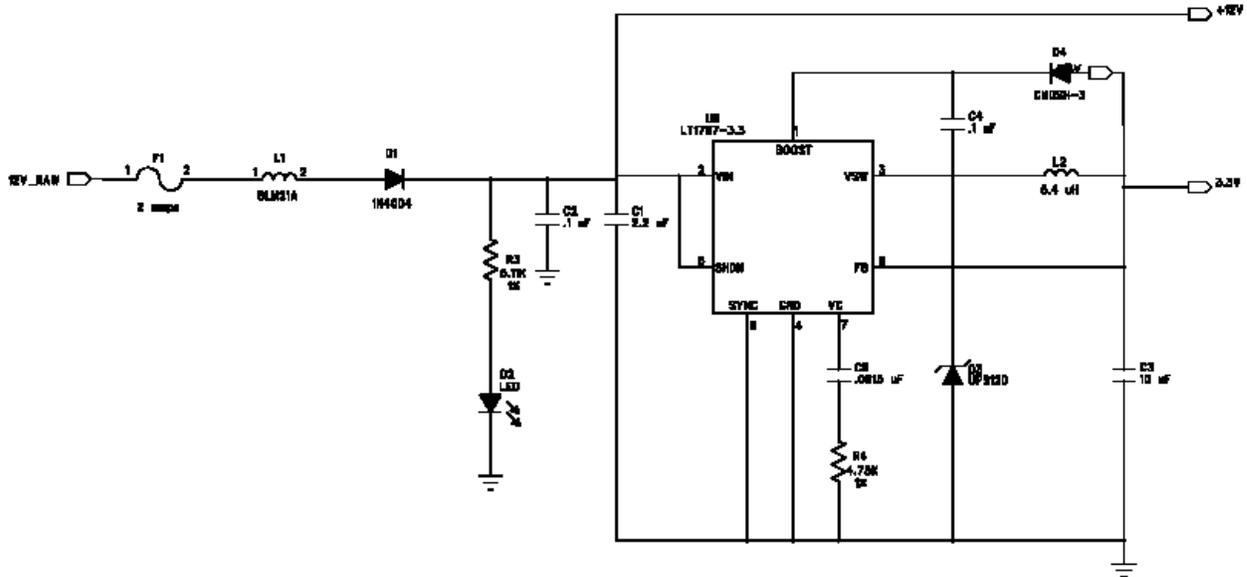
INTERNAL SCHEMATIC OF TX KEY

For those installers who need to know the characteristics of the TX KEY from the FLEX IV DSP DISPATCH CONTROLLER, the following internal schematic is supplied.



INTERNAL SCHEMATIC OF POWER SUPPLY

For those installers who believe they damaged the FLEX IV DSP DISPATCH CONTROLLER, by reversing the power supply voltage, then the following schematic should dispel those theories.



The following things should be noted.

1. The fuse is rated at 2 amps and must be soldered onto P.C. board.
2. Diode D1 prevents the unit from being damaged if the power supply leads are reversed.

LEVEL CONTROLS FOR THE FLEX IV

There are five POTS on the FLEX IV DSP DISPATCH CONTROLLER that are accessible by removing the front plate. The plate can be removed without removing the unit from the rack.

CONTRAST

The CONTRAST pot is used to adjust the contrast on the LCD.

CTCSS

The CTCSS pot is used to adjust the level going to the TX SUB point on the removable connector.

DCS/LTR

The DCS/LTR pot is used to adjust the level going to the TX SUB point on the removable connector.

SQUELCH

The SQUELCH pot is used to adjust the level it takes for squelch detector to indicate it's receiving a signal from the mobile or portable radio.

PREAMP

The preamp is used to adjust the RX IN level going to the CTCSS, DCS, and LTR decoders as well as the audio going to the CODEC. This adjustment is normally set so the data led inside the unit (D27) is just starting to blink.

The audio out level is controlled entirely by programming the system. The audio in level is controlled both by the PREAMP pot as well as programming the system.

SELECTED CONNECTORS AND JUMPERS

J1 is used as a JTAG connector to the DSP. If the system crashed, it might be necessary to reload the DSP program into the FLASH memory through that connector. The method is beyond the capability of most radio dealers so no information will be given on the techniques.

J12 is used as a JTAG connector to the microprocessor. If the system crashed, it might be necessary to reload the program into the FLASH memory of the microprocessor through that connector. This is accomplished by the CSI Model FLEX-M, which is a low cost RS232 to JTAG converter.

J13 is set for diagnostic modes and testing modes. There are 7 jumpers J13-1 to J13-7 (from right to left).

For Flex IV units as network LTR controllers, the settings are as follows.

J13-7 is used to set the unit in diagnostic mode 3.

J13-6 is the factory test mode.

J13-5 is the factory test mode.

J13-4 is the factory test mode.

J13-3 is used to set the unit in diagnostic mode 1.

J13-2 is used to set the unit in diagnostic mode 2.

J13-1 J13-4 is the factory test mode.

JP6 when inserted will allow the SSB capability of some radios.

JP7 when inserted will allow the TX SUB to be directly coupled instead of capacitive coupled.

JP8 when inserted, the gain of the TX SUB final amp has a gain of 2.5 and when removed has a gain of 10.

JP9 when inserted, the gain of the preamp is 10 and when removed has a gain of 100.

JP10 should be inserted when using radios with SSB capability and removed otherwise.

JP11 when inserted provides a 619 ohm termination resistor across the RS485 interface and when not inserted, there is no termination resistor.

OVERVIEW

The Flex IV Series Networking LTR Controller and Community Tone Panel is a sophisticated networking, dispatch only, trunking Repeater Manager (Controller) and Community Tone Panel for use on LTR trunked repeater systems. The Flex IV Series LTR Controller and Community Tone Panel may not be used with any other makes of LTR controllers including Connect Systems Inc. models LT-4200 or LT-4900. The Flex IV Series LTR Controller and Community Tone Panel provides up to 250 LTR USER ID's per repeater, 112 DCS users and 51 CTCSS users. There may be up to 20 repeaters per system.

The Flex IV Series LTR Controller and Community Tone Panel "talks" to the other controllers on the system using a proprietary RS485 Bus Protocol that transfers both LTR data and Programming data. Other panels use two separate busses.

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 ID 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 most levels from thousands of miles away via the Internet.

A CLOSER LOOK

LTR BUS FOR THE FLEX IV AND FLEX III-A CONTROLLERS

Select one of the FLEX IV's as a master. All other FLEX IV's and FLEX III-A's are slaves. Each FLEX IV should be programmed over the IP network individually. The FLEX III-A's will be programmed from the master FLEX IV via cloning.

Daisy chain connections are used for the LTR bus. Use the wires provided by CSI to connect the RPTR BUS of each Flex IV or FLEX III-A LTR repeater controller to the next FLEX IV or FLEX III-A repeater controller.

INSTALLATION PROCEDURES

Each FLEX IV controller shipped by CSI has the default settings as follows:

IP address: 192.168.1.80
subnet mask: 255.255.255.0
gateway : 192.168.1.254
repeater number: 1
site number: 1.

1. Assign each FLEX IV controller a new IP address, a site number and a repeater number.
2. Select one of the Flex IV units as the master at each site. Only one master is allowed at each site.
3. Use FlexCtrl IV.exe to create the .ini file which contains the parameters for each Flex IV unit.
4. Run Flex_PC.exe. Use option D (Load Program Data into Flex IV) to load all parameters into Flex IV.
5. Test each Flex IV unit to make sure it works with its repeater.
6. If you have Flex III-A in the system, you must program the Flex III-A units as slaves and put the parameters for Flex III-A units into the master.
7. Connect the LTR Bus from the master to all slaves at each site.

If you are still having problems, call Connect Systems Inc. at 1-800-545-1349 for technical assistance.

DIAGNOSTIC MODES

There are three special diagnostic modes for this product.

Diagnostic Mode 1

By putting a jumper into J13-3, the system will generate an LTR signal defined by the repeater number and the TEST ID CODE. Audio on the input is passed to the output. This diagnostic mode is used for the following:

It allows the user to set the LTR modulation level with a service monitor and to set the LTR encode polarity to match the radios. The LTR/DCS P5 pot sets the overall level of the LTR. The parameter LTR ENCODE POLARITY determines the transmitted LTR polarity. It is in line 40 of REPEATER PARAMETER AREA.

Diagnostic Mode 2

By putting a jumper into J13-2, 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 similar to that which is shown below:

```
-----  
|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 3

By putting a jumper into JP13-7 and resetting the Flex IV unit, it sets the Flex IV unit to new IP settings. This allows the user to regain access from IP network in case it was programmed with incorrect IP settings.

Default settings are:

IP: 192.168.1.80

Subnet mask: 255.255.255.0

Gateway IP: 192.168.1.254

IMPORTANT NOTE

In the following sections, we provide full details for each parameter in the FLEX IV setup. For ease of setup of these parameters, refer to the program FlexCtrl.exe on the Program Disc supplied by CSI.

GLOBAL PROGRAMMING AREA

STORED IN INI FILE

REPEATER NUMBER

***0000#01#MM#**

MM ranges from 1 to 20

Default = 1

In an LTR system, there are up to 20 repeaters at a given site. Each repeater is a unique number from 1 through 20. If the controllers are using only CTCSS or DCS, then this parameter has no meaning.

SITE NUMBER

***0000#02#MM#**

MM ranges from 1 to 99

Default = 1

This networking system supports up to 99 different sites. Each site can have up to 20 repeaters. There is nothing preventing the system designer from having a single physical site having multiple site numbers.

CTCSS PROGRAMMING AREA

In the following parameters, "RR" represents the repeater number at the site and can have a value between 1 and 20 and "NNN" represents a CTCSS code and the available codes are as follows:

TABLE OF CTCSS TONES AND THE CORRESPONDING USER VALUES

<u>CTCSS TONE</u>	<u>USER VALUE</u>	<u>CTCSS TONE</u>	<u>USER VALUE</u>
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

COURTESY BEEP***10RR#NNN#01#J#**

J = 1 = Enabled, J = 0 = Disabled

Default = 0

The courtesy beep is used to indicate to the user that the other party released its PTT. The courtesy beep happens immediately after the COS or internal squelch goes from a true condition to a false condition. This beep indicates to the other party that they can start speaking. In a CTCSS/DCS system, the beep happens during the hang time. In an LTR system there is no hang time so it happens immediately after the turn off code is received.

CTCSS DURING HANG TIME***10RR#NNN#02#J#**

J = 1 = Enabled, J = 0 = Disabled

Default = 1

If the CTCSS during hang time is enabled, the CTCSS continues during hang time even though the user has turned off their radio. If the parameter is disabled, then the CTCSS turns off immediately after the systems goes into hang time.

SUBSCRIBER ENABLE/DISABLE***10RR#NNN#03#J#**

J = 1 = Enabled, J = 0 = Disabled

Default = 0

If subscriber enable/disable is enabled, and the specified tone is received, the system will repeat this conversation on the local repeater. If the feature is disabled, then the conversation will not be repeated. This feature is independent of the network mode.

RESERVE TONE***10RR#NNN#04#J#**

J = 1 = Enabled, J = 0 = Disabled

Default = 0

If a subscriber tone is turned off and reserve tone is enabled, the repeater will come up, but no audio will pass. Beeps indicate reserve tone is active. This feature is typically used for reserving a tone or code on a radio channel without actually using the channel. It prevents nearby repeater operators from using the reserved tone on the same channel.

NETWORK MODE***10RR#NNN#05#J#**

J = 1 = Enabled, J = 0 = Disabled

Default = 1

If the network mode is enabled, then this tone will setup a network call. The actual destination addresses are defined in the Global IP sections of the programming. This feature is independent of the subscriber enable/disable parameter. If this feature is enabled but the subscriber enable/disable feature is disabled, then the output of the VoIP channel will go to the transmitter of the attached repeater and the receiver audio will be sent using VoIP over the network. The receiver from this repeater will not be sent over the transmitter thereby allowing a

minimum amount of privacy. If this feature is disabled, then a network call will not be made.

PRIORITY LEVEL

***10RR#NNN#07#M#**

M = 0 - 3

Default = 0

In certain applications, it might be desired to allow certain users to have priority over other users. As an example, the chief of police might want the authority to send a message over all the channels in the network, even if they are currently in use. In the current version, only priority level 0 is used. Priority level 0 does not give priority over any other user

SITE 0 TELCO TYPE

***10RR#NNN#08#M#**

M = 0 - 3

Default = 0

M = 0: Telephone Line not used
M = 1: Phone Patch, use speed dial
M = 2: Phone Patch, manual dial
M = 3: Ring Local Telephone

This feature is not supported in the FLEX IV DSP-D DISPATCH CONTROLLER.

SITE 0 TELEPHONE NUMBER

***10RR#NNN#09#MMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is to wait for dial tone and "W" is to wait one second. This feature is not supported in the FLEX IV DSP-D DISPATCH CONTROLLER.

SITE 1 REPEATER NUMBER

***10RR#NNN#10#MMNN#**

MM = SITE = 0 - 99

Default = 00

NN = REPEATER NUMBER = 0 - 20

Default = 00

The repeater number is a number associated with the Global IP table and is used as a shortcut to the full IP address. If the value of the repeater number is 0000, then site 1 will not be used for this particular tone.

SITE 1 CODE TYPE

***10RR#NNN#11#M#**

M = 0 - 5

Default = 0

Code Type is a selectable field indicating if the code at the destination is NONE(0), CTCSS(1), DCS(2), LTR(3), P25(4), or OTHER(5).

SITE 1 CODE

***10RR#NNN#12#MMMMM#**

MMMMM = CTCSS,DCS,LTR,P25,OTHER CODE

Default = 000000

This is a code corresponding to the code type that is used to tell the remote site how to set up the channel. If the number of characters required by the code is less than 6, then the code is

left justified and zeros are filled to the right. As an example, if the DCS code is 023, then MMMMMM = 023000.

SITE 1 TELCO TYPE

***10RR#NNN#13#M#**

Default = 0

M = 0 - 3

M = 0: Telephone Line not used

M = 1: Phone Patch, use speed dial

M = 2: Phone Patch, manual dial

M = 3: Ring Local Telephone

The telephone line used with this parameter is actually the telephone line at the remote site. This implies that the destination FLEX IV CONTROLLER at the remote site must be the Public Safety version. This allows the system to make local telephone calls even though the originator of the telephone might be on another continent.

SITE 1 TELEPHONE NUMBER

***10RR#NNN#14#MMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second.

SITE 2 REPEATER NUMBER

***10RR#NNN#15#MMNN#**

MM = SITE = 0 - 99

Default = 00

NN = REPEATER NUMBER = 0 - 20

Default = 00

The repeater number is a number associated with the Global IP table and is used as a shortcut to the full IP address. If the value of the repeater number is 0000, then site 2 will not be used for this particular tone.

SITE 2 CODE TYPE

***10RR#NNN#16#M#**

M = 0 - 5

Default = 0

Code Type is a selectable field indicating if the code at the destination is NONE(0), CTCSS(1), DCS(2), LTR(3), P25(4), or OTHER(5).

SITE 2 CODE

***10RR#NNN#17#MMMMMM#**

MMMMMM = CTCSS,DCS,LTR,P25,OTHER CODE

Default = 000000

This is a code corresponding to the code type that is used to tell the remote site how to set up the channel. If the number of characters required by the code is less than 6, then the code is left justified and zeros are filled to the right. As an example, if the DCS code is 023, then MMMMMM = 023000.

SITE 2 TELCO TYPE

***10RR#NNN#18#M#**

Default = 0

M = 0 - 3

M = 0: Telephone Line not used

M = 1: Phone Patch, use speed dial

M = 2: Phone Patch, manual dial
M = 3: Ring Local Telephone

The telephone line used with this parameter is actually the telephone line at the remote site. This implies that the destination FLEX IV CONTROLLER at the remote site must be the Public Safety version. This allows the system to make local telephone calls even though the originator of the telephone might be on another continent.

SITE 2 TELEPHONE NUMBER

***10RR#NNN#19#MMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second.

SITE 3 REPEATER NUMBER

***10RR#NNN#20#MMNN#**

MM = SITE = 0 - 99

Default = 00

NN = REPEATER NUMBER = 0 - 20

Default = 00

The repeater number is a number associated with the Global IP table and is used as a shortcut to the full IP address. If the value of the repeater number is 0000, then site 1 will not be used for this particular tone.

SITE 3 CODE TYPE

***10RR#NNN#21#M#**

M = 0 - 5

Default = 0

Code Type is a selectable field indicating if the code at the destination is NONE(0), CTCSS(1), DCS(2), LTR(3), P25(4), or OTHER(5).

SITE 3 CODE

***10RR#NNN#22#MMMMM#**

MMMMM = CTCSS,DCS,LTR,P25,OTHER CODE

Default = 000000

This is a code corresponding to the code type that is used to tell the remote site how to set up the channel. If the number of characters required by the code is less than 6, then the code is left justified and zeros are filled to the right. As an example, if the DCS code is 023, then MMMMM = 023000.

SITE 3 TELCO TYPE

***10RR#NNN#23#M#**

M = 0 - 3

Default = 0

M = 0: Telephone Line not used

M = 1: Phone Patch, use speed dial

M = 2: Phone Patch, manual dial

M = 3: Ring Local Telephone

The telephone line used with this parameter is actually the telephone line at the remote site. This implies that the destination FLEX IV CONTROLLER at the remote site must be the Public Safety version. This allows the system to make local telephone calls even though the originator of the telephone might be on another continent.

SITE 3 TELEPHONE NUMBER

***10RR#NNN#24#MMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second.

SITE 4 REPEATER NUMBER

***10RR#NNN#25#MMNN#**

MM = SITE = 0 - 99

Default = 00

NN = REPEATER NUMBER = 0 - 20

Default = 00

The repeater number is a number associated with the Global IP table and is used as a shortcut to the full IP address. If the value of the repeater number is 0000, then site 5 will not be used for this particular tone.

SITE 4 CODE TYPE

***10RR#NNN#26#M#**

M = 0 - 5

Default = 0

Code Type is a selectable field indicating if the code at the destination is NONE(0), CTCSS(1), DCS(2), LTR(3), P25(4), or OTHER(5).

SITE 4 CODE

***10RR#NNN#27#MMMMMM#**

MMMMMM = CTCSS,DCS,LTR,P25,OTHER CODE

Default = 000000

This is a code corresponding to the code type that is used to tell the remote site how to set up the channel. If the number of characters required by the code is less than 6, then the code is left justified and zeros are filled to the right. As an example, if the DCS code is 023, then MMMMMM = 023000.

SITE 4 TELCO TYPE

***10RR#NNN#28#M#**

M = 0 - 3

Default = 0

M = 0: Telephone Line not used

M = 1: Phone Patch, use speed dial

M = 2: Phone Patch, manual dial

M = 3: Ring Local Telephone

The telephone line used with this parameter is actually the telephone line at the remote site. This implies that the destination FLEX IV CONTROLLER at the remote site must be the Public Safety version. This allows the system to make local telephone calls even though the originator of the telephone might be on another continent.

SITE 4 TELEPHONE NUMBER

***10RR#NNN#29#MMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second.

SITE 5 REPEATER NUMBER

***10RR#NNN#30#MMNN#**

MM = SITE = 0 - 99

Default = 00

NN = REPEATER NUMBER = 0 - 20

Default = 00

The repeater number is a number associated with the Global IP table and is used as a shortcut to the full IP address. If the value of the repeater number is 0000, then site 5 will not be used for this particular tone.

SITE 5 CODE TYPE

***10RR#NNN#31#M#**

M = 0 - 5

Default = 0

Code Type is a selectable field indicating if the code at the destination is NONE(0), CTCSS(1), DCS(2), LTR(3), P25(4), or OTHER(5).

SITE 5 CODE

***10RR#NNN#32#MMMMMM#**

MMMMMM = CTCSS,DCS,LTR,P25,OTHER CODE

Default = 000000

This is a code corresponding to the code type that is used to tell the remote site how to set up the channel. If the number of characters required by the code is less than 6, then the code is left justified and zeros are filled to the right. As an example, if the DCS code is 023, then MMMMMM = 023000.

SITE 5 TELCO TYPE

***10RR#NNN#33#M#**

M = 0 - 3

Default = 0

- M = 0: Telephone Line not used
- M = 1: Phone Patch, use speed dial
- M = 2: Phone Patch, manual dial
- M = 3: Ring Local Telephone

The telephone line used with this parameter is actually the telephone line at the remote site. This implies that the destination FLEX IV CONTROLLER at the remote site must be the Public Safety version. This allows the system to make local telephone calls even though the originator of the telephone might be on another continent.

SITE 5 TELEPHONE NUMBER

***10RR#NNN#34#MMMMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second.

SITE 6 REPEATER NUMBER

***10RR#NNN#35#MMNN#**

MM = SITE = 0 - 99

Default = 00

NN = REPEATER NUMBER = 0 - 20

Default = 00

The repeater number is a number associated with the Global IP table and is used as a shortcut to the full IP address. If the value of the repeater number is 0000, then site 6 will not be used for this particular tone.

SITE 6 CODE TYPE

***10RR#NNN#36#M#**

M = 0 - 5

Default = 0

Code Type is a selectable field indicating if the code at the destination is NONE(0), CTCSS(1), DCS(2), LTR(3), P25(4), or OTHER(5).

SITE 6 CODE

***10RR#NNN#37#MMMMMM#**

MMMMMM = CTCSS,DCS,LTR,P25,OTHER CODE

Default = 000000

This is a code corresponding to the code type that is used to tell the remote site how to set up the channel. If the number of characters required by the code is less than 6, then the code is left justified and zeros are filled to the right. As an example, if the DCS code is 023, then MMMMM = 023000.

SITE 6 TELCO TYPE

***10RR#NNN#38#M#**

M = 0 - 3

Default = 0

- M = 0: Telephone Line not used
- M = 1: Phone Patch, use speed dial
- M = 2: Phone Patch, manual dial
- M = 3: Ring Local Telephone

The telephone line used with this parameter is actually the telephone line at the remote site. This implies that the destination FLEX IV CONTROLLER at the remote site must be the Public Safety version. This allows the system to make local telephone calls even though the originator of the telephone might be on another continent.

SITE 6 TELEPHONE NUMBER

***10RR#NNN#39#MMMMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second.

SITE 7 REPEATER NUMBER

***10RR#NNN#40#MMNN#**

MM = SITE = 0 - 99

Default = 00

NN = REPEATER NUMBER = 0 - 20

Default = 00

The repeater number is a number associated with the Global IP table and is used as a shortcut to the full IP address. If the value of the repeater number is 0000, then site 7 will not be used for this particular tone.

SITE 7 CODE TYPE

***10RR#NNN#41#M#**

M = 0 - 5

Default = 0

Code Type is a selectable field indicating if the code at the destination is NONE(0), CTCSS(1), DCS(2), LTR(3), P25(4), or OTHER(5).

SITE 7 CODE

***10RR#NNN#42#MMMMMM#**

MMMMMM = CTCSS,DCS,LTR,P25,OTHER CODE

Default = 000000

This is a code corresponding to the code type that is used to tell the remote site how to set up the channel. If the number of characters required by the code is less than 6, then the code is left justified and zeros are filled to the right. As an example, if the DCS code is 023, then MMMMMM = 023000.

SITE 7 TELCO TYPE

***10RR#NNN#43#M#**

M = 0 - 3

Default = 0

- M = 0: Telephone Line not used
- M = 1: Phone Patch, use speed dial
- M = 2: Phone Patch, manual dial
- M = 3: Ring Local Telephone

The telephone line used with this parameter is actually the telephone line at the remote site. This implies that the destination FLEX IV CONTROLLER at the remote site must be the Public Safety version. This allows the system to make local telephone calls even though the originator of the telephone might be on another continent.

SITE 7 TELEPHONE NUMBER

***10RR#NNN#44#MMMMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second.

In the above parameters, "RR" represents the repeater number at the site and can have a value between 1 and 20. and "NNN" represents a CTCSS code.

DCS PROGRAMMING AREA

In the following parameters, "RR" represents the repeater number at the site and can have a value between 1 and 20 and "NNN" represents a DCS code and the available codes are as follows:

TABLE OF DCS CODES

<u>DCS CODE</u>		<u>DCS CODE</u>		<u>DCS CODE</u>
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

<u>DCS</u>	<u>INVERSE</u>	<u>DCS</u>	<u>INVERSE</u>	<u>DCS</u>	<u>INVERSE</u>
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		

STORED IN INI FILE

COURTESY BEEP

*20RR#NNN#01#J#

J = 1 = Enabled, J = 0 = Disabled

Default = 0

The courtesy beep is used to indicate to the user that the other party released its PTT. The courtesy beep happens immediately after the COS or internal squelch goes from a true condition to a false condition. This beep indicates to the other party that they can start speaking. In a CTCSS/DCS system, the beep happens during the hang time. In an LTR system there is no hang time so it happens immediately after the turn off code is received.

DCS DURING HANG TIME

***20RR#NNN#02#J#**

J = 1 = Enabled, J = 0 = Disabled

Default = 1

If the DCS during hang time is enabled, the DCS continues during hang time even though the user has turned off their radio. If the parameter is disabled, then the DCS turns off immediately after the systems goes into hang time.

SUBSCRIBER ENABLE/DISABLE

***20RR#NNN#03#J#**

J = 1 = Enabled, J = 0 = Disabled

Default = 0

If subscriber enable/disable is enabled, and the specified code is received, the system will repeat this conversation on the local repeater. If the feature is disabled, then the conversation will not be repeated. This feature is independent of the network mode.

RESERVE CODE

***20RR#NNN#04#J#**

J = 1 = Enabled, J = 0 = Disabled

Default = 0

If a subscriber code is turned off and reserve code is enabled, the repeater will come up, but no audio will pass. Beeps indicate reserve code is active. This feature is typically used for reserving a code on a radio channel without actually using the channel. It prevents nearby repeater operators from using the reserved code.

NETWORK MODE

***20RR#NNN#05#J#**

J = 1 = Enabled, J = 0 = Disabled

Default = 1

If the network mode is enabled, then this code will setup a network call. The actual destination addresses are defined in the Global IP sections of the programming. This feature is independent of the subscriber enable/disable parameter. If this feature is enabled but the subscriber enable/disable feature is disabled, then the output of the VoIP channel will go to the transmitter of the attached repeater and the receiver audio will be sent using VoIP over the network. The receiver from this repeater will not be sent over the transmitter thereby allowing a minimum amount of privacy. If this feature is disabled, then a network call will not be made.

PRIORITY LEVEL

***20RR#NNN#07#M#**

M = 0 - 3

Default = 0

In certain applications, it might be desired to allow certain users to have priority over other users. As an example, the chief of police might want the authority to send a message over all the channels in the network, even if they are currently in use. In the current version, only priority level 0 is used. Priority level 0 does not give priority over any other user.

SITE 0 TELCO TYPE

***20RR#NNN#08#M#**

Default = 0

M = 0 - 3

M = 0: Telephone Line not used

M = 1: Phone Patch, use speed dial

M = 2: Phone Patch, manual dial

M = 3: Ring Local Telephone

This feature is not supported in the FLEX IV-DSP-D DISPATCH CONTROLLER.

SITE 0 TELEPHONE NUMBER

***20RR#NNN#09#MMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second. This feature is not supported in the FLEX IV-DSP-D DISPATCH CONTROLLER.

SITE 1 REPEATER NUMBER

***20RR#NNN#10#MMNN#**

Default = 00

MM = SITE = 0 - 99

Default = 00

NN = REPEATER NUMBER = 0 - 20

The repeater number is a number associated with the Global IP table and is used as a shortcut to the full IP address. If the value of the repeater number is 0000, then site 1 will not be used for this particular tone.

SITE 1 CODE TYPE

***20RR#NNN#11#M#**

Default = 0

M = 0 - 5

Code Type is a selectable field indicating if the code at the destination is NONE(0), CTCSS(1), DCS(2), LTR(3), P25(4), or OTHER(5).

SITE 1 CODE

***20RR#NNN#12#MMMMMM#**

Default = 000000

MMMMMM = CTCSS,DCS,LTR,P25,OTHER CODE

This is a code corresponding to the code type that is used to tell the remote site how to set up the channel. If the number of characters required by the code is less than 6, then the code is left justified and zeros are filled to the right. As an example, if the DCS code is 023, then MMMMMM = 023000.

SITE 1 TELCO TYPE

***20RR#NNN#13#M#**

Default = 0

M = 0 - 3

M = 0: Telephone Line not used

M = 1: Phone Patch, use speed dial

M = 2: Phone Patch, manual dial

M = 3: Ring Local Telephone

The telephone line used with this parameter is actually the telephone line at the remote site. This implies that the destination FLEX IV CONTROLLER at the remote site must be the

Public Safety version. This allows the system to make local telephone calls even though the originator of the telephone might be on another continent.

SITE 1 TELEPHONE NUMBER

***20RR#NNN#14#MMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second.

SITE 2 REPEATER NUMBER

***20RR#NNN#15#MMNN#**

MM = SITE = 0 - 99

Default = 00

NN = REPEATER NUMBER = 0 - 20

Default = 00

The repeater number is a number associated with the Global IP table and is used as a shortcut to the full IP address. If the value of the repeater number is 0000, then site 2 will not be used for this particular code.

SITE 2 CODE TYPE

***20RR#NNN#16#M#**

M = 0 - 5

Default = 0

Code Type is a selectable field indicating if the code at the destination is NONE(0), CTCSS(1), DCS(2), LTR(3), P25(4), or OTHER(5).

SITE 2 CODE

***20RR#NNN#17#MMMMMM#**

MMMMMM = CTCSS,DCS,LTR,P25,OTHER CODE

Default = 000000

This is a code corresponding to the code type that is used to tell the remote site how to set up the channel. If the number of characters required by the code is less than 6, then the code is left justified and zeros are filled to the right. As an example, if the DCS code is 023, then MMMMM = 023000.

SITE 2 TELCO TYPE

***20RR#NNN#18#M#**

M = 0 - 3

Default = 0

M = 0: Telephone Line not used

M = 1: Phone Patch, use speed dial

M = 2: Phone Patch, manual dial

M = 3: Ring Local Telephone

The telephone line used with this parameter is actually the telephone line at the remote site. This implies that the destination FLEX IV CONTROLLER at the remote site must be the Public Safety version. This allows the system to make local telephone calls even though the originator of the telephone might be on another continent.

SITE 2 TELEPHONE NUMBER

***20RR#NNN#19#MMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second.

SITE 3 REPEATER NUMBER

***20RR#NNN#20#MMNN#**

MM = SITE = 0 - 99

Default = 00

NN = REPEATER NUMBER = 0 - 20

Default = 00

The repeater number is a number associated with the Global IP table and is used as a shortcut to the full IP address. If the value of the repeater number is 0000, then site 3 will not be used for this particular code.

SITE 3 CODE TYPE

***20RR#NNN#21#M#**

M = 0 - 5

Default = 0

Code Type is a selectable field indicating if the code at the destination is NONE(0), CTCSS(1), DCS(2), LTR(3), P25(4), or OTHER(5).

SITE 3 CODE

***20RR#NNN#22#MMMMMM#**

MMMMMM = CTCSS,DCS,LTR,P25,OTHER CODE

Default = 000000

This is a code corresponding to the code type that is used to tell the remote site how to set up the channel. If the number of characters required by the code is less than 6, then the code is left justified and zeros are filled to the right. As an example, if the DCS code is 023, then MMMMM = 023000.

SITE 3 TELCO TYPE

***20RR#NNN#23#M#**

M = 0 - 3

Default = 0

M = 0: Telephone Line not used

M = 1: Phone Patch, use speed dial

M = 2: Phone Patch, manual dial

M = 3: Ring Local Telephone

The telephone line used with this parameter is actually the telephone line at the remote site. This implies that the destination FLEX IV CONTROLLER at the remote site must be the Public Safety version. This allows the system to make local telephone calls even though the originator of the telephone might be on another continent.

SITE 3 TELEPHONE NUMBER

***20RR#NNN#24#MMMMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second.

SITE 4 REPEATER NUMBER

***20RR#NNN#25#MMNN#**

MM = SITE = 0 - 99

Default = 00

NN = REPEATER NUMBER = 0 - 20

Default = 00

The repeater number is a number associated with the Global IP table and is used as a shortcut to the full IP address. If the value of the repeater number is 0000, then site 4 will not be used for this particular code.

SITE 4 CODE TYPE

***20RR#NNN#26#M#**

M = 0 - 5

Default = 0

Code Type is a selectable field indicating if the code at the destination is NONE(0), CTCSS(1), DCS(2), LTR(3), P25(4), or OTHER(5).

SITE 4 CODE

***20RR#NNN#27#MMMMMM#**

MMMMMM = CTCSS,DCS,LTR,P25,OTHER CODE

Default = 000000

This is a code corresponding to the code type that is used to tell the remote site how to set up the channel. If the number of characters required by the code is less than 6, then the code is left justified and zeros are filled to the right. As an example, if the DCS code is 023, then MMMMMM = 023000.

SITE 4 TELCO TYPE

***20RR#NNN#28#M#**

M = 0 - 3

Default = 0

- M = 0: Telephone Line not used
- M = 1: Phone Patch, use speed dial
- M = 2: Phone Patch, manual dial
- M = 3: Ring Local Telephone

The telephone line used with this parameter is actually the telephone line at the remote site. This implies that the destination FLEX IV CONTROLLER at the remote site must be the Public Safety version. This allows the system to make local telephone calls even though the originator of the telephone might be on another continent.

SITE 4 TELEPHONE NUMBER

***20RR#NNN#29#MMMMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second.

SITE 5 REPEATER NUMBER

***20RR#NNN#30#MMNN#**

MM = SITE = 0 - 99

Default = 00

NN = REPEATER NUMBER = 0 - 20

Default = 00

The repeater number is a number associated with the Global IP table and is used as a shortcut to the full IP address. If the value of the repeater number is 0000, then site 5 will not be used for this particular code.

SITE 5 CODE TYPE

***20RR#NNN#31#M#**

M = 0 - 5

Default = 0

Code Type is a selectable field indicating if the code at the destination is NONE(0), CTCSS(1), DCS(2), LTR(3), P25(4), or OTHER(5).

SITE 5 CODE

***20RR#NNN#32#MMMMMM#**

MMMMMM = CTCSS,DCS,LTR,P25,OTHER CODE

Default = 000000

This is a code corresponding to the code type that is used to tell the remote site how to set up the channel. If the number of characters required by the code is less than 6, then the code is left justified and zeros are filled to the right. As an example, if the DCS code is 023, then MMMMM = 023000.

SITE 5 TELCO TYPE

***20RR#NNN#33#M#**

M = 0 - 3

Default = 0

M = 0: Telephone Line not used

M = 1: Phone Patch, use speed dial

M = 2: Phone Patch, manual dial

M = 3: Ring Local Telephone

The telephone line used with this parameter is actually the telephone line at the remote site. This implies that the destination FLEX IV CONTROLLER at the remote site must be the Public Safety version. This allows the system to make local telephone calls even though the originator of the telephone might be on another continent.

SITE 5 TELEPHONE NUMBER

***20RR#NNN#34#MMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second.

SITE 6 REPEATER NUMBER

***20RR#NNN#35#MMNN#**

MM = SITE = 0 - 99

Default = 00

NN = REPEATER NUMBER = 0 - 20

Default = 00

The repeater number is a number associated with the Global IP table and is used as a shortcut to the full IP address. If the value of the repeater number is 0000, then site 6 will not be used for this particular code.

SITE 6 CODE TYPE

***20RR#NNN#36#M#**

M = 0 - 5

Default = 0

Code Type is a selectable field indicating if the code at the destination is NONE(0), CTCSS(1), DCS(2), LTR(3), P25(4), or OTHER(5).

SITE 6 CODE

***20RR#NNN#37#MMMMMM#**

MMMMMM = CTCSS,DCS,LTR,P25,OTHER CODE

Default = 000000

This is a code corresponding to the code type that is used to tell the remote site how to set up the channel. If the number of characters required by the code is less than 6, then the code is left justified and zeros are filled to the right. As an example, if the DCS code is 023, then MMMMMM = 023000.

SITE 6 TELCO TYPE

***20RR#NNN#38#M#**

M = 0 - 3

Default = 0

- M = 0: Telephone Line not used
- M = 1: Phone Patch, use speed dial
- M = 2: Phone Patch, manual dial
- M = 3: Ring Local Telephone

The telephone line used with this parameter is actually the telephone line at the remote site. This implies that the destination FLEX IV CONTROLLER at the remote site must be the Public Safety version. This allows the system to make local telephone calls even though the originator of the telephone might be on another continent.

SITE 6 TELEPHONE NUMBER

***20RR#NNN#39#MMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second.

SITE 7 REPEATER NUMBER

***20RR#NNN#40#MMNN#**

MM = SITE = 0 - 99

Default = 00

NN = REPEATER NUMBER = 0 - 20

Default = 00

The repeater number is a number associated with the Global IP table and is used as a shortcut to the full IP address. If the value of the repeater number is 0000, then site 7 will not be used for this particular code.

SITE 7 CODE TYPE

***20RR#NNN#41#M#**

M = 0 - 5

Default = 0

Code Type is a selectable field indicating if the code at the destination is NONE(0), CTCSS(1), DCS(2), LTR(3), P25(4), or OTHER(5).

SITE 7 CODE

***20RR#NNN#42#MMMMM#**

MMMMM = CTCSS,DCS,LTR,P25,OTHER CODE

Default = 000000

This is a code corresponding to the code type that is used to tell the remote site how to set up the channel. If the number of characters required by the code is less than 6, then the code is left justified and zeros are filled to the right. As an example, if the DCS code is 023, then MMMMMM = 023000.

SITE 7 TELCO TYPE

***20RR#NNN#43#M#**

M = 0 - 3

Default = 0

M = 0: Telephone Line not used
M = 1: Phone Patch, use speed dial
M = 2: Phone Patch, manual dial
M = 3: Ring Local Telephone

The telephone line used with this parameter is actually the telephone line at the remote site. This implies that the destination FLEX IV CONTROLLER at the remote site must be the Public Safety version. This allows the system to make local telephone calls even though the originator of the telephone might be on another continent.

SITE 7 TELEPHONE NUMBER

***20RR#NNN#44#MMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second.

In the above parameters, "RR" represents the repeater number at the site and can have a value between 1 and 20 and "NNN" represents a DCS code.

TABLE 3

LTR PROGRAMMING AREA

In the parameters below, "III" represents the LTR ID Code and can have a value between 001 and 250.

STORED IN INI FILE

COURTESY BEEP

***30RR#III#01#J#**

J = 1 = Enabled, J = 0 = Disabled Default = 0
The courtesy beep is used to indicate to the user that the other party released its PTT. The courtesy beep happens immediately after the COS or internal squelch goes from a true condition to a false condition. This beep indicates to the other party that they can start speaking. In an LTR system there is no hang time so it happens immediately after the turn off code is received.

SUBSCRIBER ENABLE/DISABLE

***30RR#III#02#J#**

J = 1 = Enabled, J = 0 = Disabled Default = 0
If subscriber enable/disable is enabled, and the specified tone is received, the system will repeat this conversation on the local repeater. If the feature is disabled, then the conversation will not be repeated. This feature is independent of the network mode.

NETWORK MODE

***30RR#III#03#J#**

J = 1 = Enabled, J = 0 = Disabled Default = 1
If the network mode is enabled, then this tone will setup a network call. The actual destination addresses are defined in the Global IP sections of the programming. This feature is independent of the subscriber enable/disable parameter. If this feature is enabled but the subscriber enable/disable feature is disabled, then the output of the VoIP channel will go to the transmitter of the attached repeater and the receiver audio will be sent using VoIP over the network. The receiver from this repeater will not be sent over the transmitter thereby allowing a minimum amount of privacy. If this feature is disabled, then a network call will not be made.

PRIORITY LEVEL

***30RR#III#07#M#**

M = 0 - 3 Default = 0
In certain applications, it might be desired to allow certain users to have priority over other users. As an example, the chief of police might want the authority to send a message over all the

channels in the network, even if they are currently in use. In the current version, only priority level 0 is used. Priority level 0 does not give priority over any other user

SITE 0 TELCO TYPE

***30RR#III#08#M#**

M = 0 - 3

Default = 0

- M = 0: Telephone Line not used
- M = 1: Phone Patch, use speed dial
- M = 2: Phone Patch, manual dial
- M = 3: Ring Local Telephone

This feature is not supported in the FLEX IV-DSP-D DISPATCH CONTROLLER.

SITE 0 TELEPHONE NUMBER

***30RR#III#09#MMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second. This feature is not supported in the FLEX IV-DSP-D DISPATCH CONTROLLER.

SITE 1 REPEATER NUMBER

***30RR#III#10#MMNN#**

MM = SITE = 0 - 99

Default = 00

NN = REPEATER NUMBER = 0 - 20

Default = 00

The repeater number is a number associated with the Global IP table and is used as a shortcut to the full IP address. If the value of the repeater number is 0000, then site 1 will not be used for this particular LTR code.

SITE 1 CODE TYPE

***30RR#III#11#M#**

M = 0 - 5

Default = 0

Code Type is a selectable field indicating if the code at the destination is NONE(0), CTCSS(1), DCS(2), LTR(3), P25(4), or OTHER(5).

SITE 1 CODE

***30RR#III#12#MMMMMM#**

MMMMMM = CTCSS,DCS,LTR,P25,OTHER CODE

Default = 000000

This is a code corresponding to the code type that is used to tell the remote site how to set up the channel. If the number of characters required by the code is less than 6, then the code is left justified and zeros are filled to the right. As an example, if the DCS code is 023, then MMMMM = 023000.

SITE 1 TELCO TYPE

***30RR#III#13#M#**

M = 0 - 3

Default = 0

- M = 0: Telephone Line not used
- M = 1: Phone Patch, use speed dial
- M = 2: Phone Patch, manual dial

M = 3: Ring Local Telephone

The telephone line used with this parameter is actually the telephone line at the remote site. This implies that the destination FLEX IV CONTROLLER at the remote site must be the Public Safety version. This allows the system to make local telephone calls even though the originator of the telephone might be on another continent.

SITE 1 TELEPHONE NUMBER

***30RR#III#14#MMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second.

SITE 2 REPEATER NUMBER

***30RR#III#15#MMNN#**

MM = SITE = 0 - 99

Default = 00

NN = REPEATER NUMBER = 0 - 20

Default = 00

The repeater number is a number associated with the Global IP table and is used as a shortcut to the full IP address. If the value of the repeater number is 0000, then site 2 will not be used for this particular tone.

SITE 2 CODE TYPE

***30RR#III#16#M#**

M = 0 - 5

Default = 0

Code Type is a selectable field indicating if the code at the destination is NONE(0), CTCSS(1), DCS(2), LTR(3), P25(4), or OTHER(5).

SITE 2 CODE

***30RR#III#17#MMMMMM#**

MMMMMM = CTCSS,DCS,LTR,P25,OTHER CODE

Default = 000000

This is a code corresponding to the code type that is used to tell the remote site how to set up the channel. If the number of characters required by the code is less than 6, then the code is left justified and zeros are filled to the right. As an example, if the DCS code is 023, then MMMMM = 023000.

SITE 2 TELCO TYPE

***30RR#III#18#M#**

M = 0 - 3

Default = 0

M = 0: Telephone Line not used

M = 1: Phone Patch, use speed dial

M = 2: Phone Patch, manual dial

M = 3: Ring Local Telephone

The telephone line used with this parameter is actually the telephone line at the remote site. This implies that the destination FLEX IV CONTROLLER at the remote site must be the Public Safety version. This allows the system to make local telephone calls even though the originator of the telephone might be on another continent.

SITE 2 TELEPHONE NUMBER

***30RR#III#19#MMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second.

SITE 3 REPEATER NUMBER

***30RR#III#20#MMNN#**

MM = SITE = 0 - 99

Default = 00

NN = REPEATER NUMBER = 0 - 20

Default = 00

The repeater number is a number associated with the Global IP table and is used as a shortcut to the full IP address. If the value of the repeater number is 0000, then site 3 will not be used for this particular tone.

SITE 3 CODE TYPE

***30RR#III#21#M#**

M = 0 - 5

Default = 0

Code Type is a selectable field indicating if the code at the destination is NONE(0), CTCSS(1), DCS(2), LTR(3), P25(4), or OTHER(5).

SITE 3 CODE

***30RR#III#22#MMMMMM#**

MMMMMM = CTCSS,DCS,LTR,P25,OTHER CODE

Default = 000000

This is a code corresponding to the code type that is used to tell the remote site how to set up the channel. If the number of characters required by the code is less than 6, then the code is left justified and zeros are filled to the right. As an example, if the DCS code is 023, then MMMMMM = 023000.

SITE 3 TELCO TYPE

***30RR#III#23#M#**

M = 0 - 3

Default = 0

- M = 0: Telephone Line not used
- M = 1: Phone Patch, use speed dial
- M = 2: Phone Patch, manual dial
- M = 3: Ring Local Telephone

The telephone line used with this parameter is actually the telephone line at the remote site. This implies that the destination FLEX IV CONTROLLER at the remote site must be the Public Safety version. This allows the system to make local telephone calls even though the originator of the telephone might be on another continent.

SITE 3 TELEPHONE NUMBER

***30RR#III#24#MMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second.

SITE 4 REPEATER NUMBER

***30RR#III#25#MMNN#**

MM = SITE = 0 - 99

Default = 00

NN = REPEATER NUMBER = 0 - 20

Default = 00

The repeater number is a number associated with the Global IP table and is used as a shortcut to the full IP address. If the value of the repeater number is 0000, then site 4 will not be used for this particular tone.

SITE 4 CODE TYPE

***30RR#III#26#M#**

M = 0 - 5

Default = 0

Code Type is a selectable field indicating if the code at the destination is NONE(0), CTCSS(1), DCS(2), LTR(3), P25(4), or OTHER(5).

SITE 4 CODE

***30RR#III#27#MMMMMM#**

MMMMMM = CTCSS,DCS,LTR,P25,OTHER CODE

Default = 000000

This is a code corresponding to the code type that is used to tell the remote site how to set up the channel. If the number of characters required by the code is less than 6, then the code is left justified and zeros are filled to the right. As an example, if the DCS code is 023, then MMMMMM = 023000.

SITE 4 TELCO TYPE

***30RR#III#28#M#**

M = 0 - 3

Default = 0

- M = 0: Telephone Line not used
- M = 1: Phone Patch, use speed dial
- M = 2: Phone Patch, manual dial
- M = 3: Ring Local Telephone

The telephone line used with this parameter is actually the telephone line at the remote site. This implies that the destination FLEX IV CONTROLLER at the remote site must be the Public Safety version. This allows the system to make local telephone calls even though the originator of the telephone might be on another continent.

SITE 4 TELEPHONE NUMBER

***30RR#III#29#MMMMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second.

SITE 5 REPEATER NUMBER

***30RR#III#30#MMNN#**

MM = SITE = 0 - 99

Default = 00

NN = REPEATER NUMBER = 0 - 20

Default = 00

The repeater number is a number associated with the Global IP table and is used as a shortcut to the full IP address. If the value of the repeater number is 0000, then site 5 will not be used for this particular tone.

SITE 5 CODE TYPE

***30RR#III#31#M#**

M = 0 - 5

Default = 0

Code Type is a selectable field indicating if the code at the destination is NONE(0), CTCSS(1), DCS(2), LTR(3), P25(4), or OTHER(5).

SITE 5 CODE

***30RR#III#32#MMMMM#**

MMMMM = CTCSS,DCS,LTR,P25,OTHER CODE

Default = 00000

This is a code corresponding to the code type that is used to tell the remote site how to set up the channel. If the number of characters required by the code is less than 6, then the code is left justified and zeros are filled to the right. As an example, if the DCS code is 023, then MMMMM = 023000.

SITE 5 TELCO TYPE

***30RR#III#33#M#**

M = 0 - 3

Default = 0

- M = 0: Telephone Line not used
- M = 1: Phone Patch, use speed dial
- M = 2: Phone Patch, manual dial
- M = 3: Ring Local Telephone

The telephone line used with this parameter is actually the telephone line at the remote site. This implies that the destination FLEX IV CONTROLLER at the remote site must be the Public Safety version. This allows the system to make local telephone calls even though the originator of the telephone might be on another continent.

SITE 5 TELEPHONE NUMBER

***30RR#III#34#MMMMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second.

SITE 6 REPEATER NUMBER

***30RR#III#35#MMNN#**

MM = SITE = 0 - 99

Default = 00

NN = REPEATER NUMBER = 0 - 20

Default = 00

The repeater number is a number associated with the Global IP table and is used as a shortcut to the full IP address. If the value of the repeater number is 0000, then site 6 will not be used for this particular tone.

SITE 6 CODE TYPE

***30RR#III#36#M#**

M = 0 - 5

Default = 0

Code Type is a selectable field indicating if the code at the destination is NONE(0), CTCSS(1), DCS(2), LTR(3), P25(4), or OTHER(5).

SITE 6 CODE

***30RR#III#37#MMMMMM#**

MMMMMM = CTCSS,DCS,LTR,P25,OTHER CODE Default = 000000
This is a code corresponding to the code type that is used to tell the remote site how to set up the channel. If the number of characters required by the code is less than 6, then the code is left justified and zeros are filled to the right. As an example, if the DCS code is 023, then MMMMMM = 023000.

SITE 6 TELCO TYPE

***30RR#III#38#M#**

M = 0 - 3 Default = 0
M = 0: Telephone Line not used
M = 1: Phone Patch, use speed dial
M = 2: Phone Patch, manual dial
M = 3: Ring Local Telephone
The telephone line used with this parameter is actually the telephone line at the remote site. This implies that the destination FLEX IV CONTROLLER at the remote site must be the Public Safety version. This allows the system to make local telephone calls even though the originator of the telephone might be on another continent.

SITE 6 TELEPHONE NUMBER

***30RR#III#39#MMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS
Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second.

SITE 7 REPEATER NUMBER

***30RR#III#40#MMNN#**

MM = SITE = 0 - 99 Default = 00
NN = REPEATER NUMBER = 0 - 20 Default = 00
The repeater number is a number associated with the Global IP table and is used as a shortcut to the full IP address. If the value of the repeater number is 0000, then site 7 will not be used for this particular tone.

SITE 7 CODE TYPE

***30RR#III#41#M#**

M = 0 - 5 Default = 0
Code Type is a selectable field indicating if the code at the destination is NONE(0), CTCSS(1), DCS(2), LTR(3), P25(4), or OTHER(5).

SITE 7 CODE

***30RR#III#42#MMMMMM#**

MMMMMM = CTCSS,DCS,LTR,P25,OTHER CODE Default = 000000
This is a code corresponding to the code type that is used to tell the remote site how to set up the channel. If the number of characters required by the code is less than 6, then the code is left justified and zeros are filled to the right. As an example, if the DCS code is 023, then MMMMMM = 023000.

SITE 7 TELCO TYPE

***30RR#III#43#M#**

Default = 0

M = 0 - 3

M = 0: Telephone Line not used

M = 1: Phone Patch, use speed dial

M = 2: Phone Patch, manual dial

M = 3: Ring Local Telephone

The telephone line used with this parameter is actually the telephone line at the remote site. This implies that the destination FLEX IV CONTROLLER at the remote site must be the Public Safety version. This allows the system to make local telephone calls even though the originator of the telephone might be on another continent.

SITE 7 TELEPHONE NUMBER

***30RR#III#44#MMMMMMMMMMMMMMMM#**

DEFAULT = ALL BLANKS

Telephone Number is the speed dial number. The allowable characters for telephone numbers are 0 - 9, *, #, W, T, and blank. "T" is wait for dial tone and "W" is wait one second.

In the above parameters, RR represents the repeater number at the site and can have a value between 1 and 20.

In the above parameters, "III" represents the LTR ID Code and can have a value between 001 and 250.

REPEATER PARAMETER AREA

STORED IN INI FILE

Programming Access

DE-EMPHASIS

***80RR#02#J#**

J = 1 = ENABLE, J = 0 = DISABLE

DEFAULT = 1

When enabled, the de-emphasis circuit is installed and when disabled, the de-emphasis circuit is not installed. If taking the audio directly from the discriminator or detector, the de-emphasis circuit is normally enabled. THE WINDOWS BASED DISPLAY MIGHT SAY UNDER REPEATER PROGRAMMING PARAMETERS "2-RADIO". THIS WILL BE FIXED IN LATER VERSIONS OF THE PROGRAM.

PROGRAMMING MODE ACCESS CODE

***80RR#05#MMMMM#**

MMMMMM = 000000 - 999999

Default 123456

The Access Code must be precisely six digits. This code is used to enter the programming mode from the IP Network. This parameter will only be supported in future version of the system.

Level Control

DTMF TELCO LEVEL

***80RR#06#MMM#**

MMM = 0 - 255

Default = 255

This is the level the DTMF will be transmitted over the telephone line.

DTMF RADIO LEVEL

***80RR#07#MMM#**

MMM = 0 - 255

Default = 50

This is the level the DTMF will be transmitted over the radio.

BEEP RADIO LEVEL

***80RR#08#MMM#**

MMM = 0 - 255

Default = 50

This is the level that annunciating beeps will be heard over the radio.

BEEP TELCO LEVEL

***80RR#09#MMM#**

MMM = 0 - 255

Default = 50

This is the level that annunciating beeps will be heard over the telephone.

CW ID RADIO LEVEL

***80RR#10#MMM#**

MMM = 0 - 255

Default = 50

It is the level for Morse code station identification over the radio.

VOICE TELCO LEVEL

***80RR#12#MMM#**

MMM = 10 - 255

Default = 0

This is the level the voice prompts will be transmitted over the telephone.

PAGING TONE RADIO LEVEL

***80RR#13#MMM#**

MMM = 0 - 255

Default = 255

This is the level the paging tones such as two tone, five six tone, and SELCAL will be transmitted over the radio.

STATE WATCH DOG TIMER

***80RR#16#MMM#**

MMM = 0 - 255

Default = 25

This is a special watch dog timer that will reset the system if it stays in a given state too long. An example of states would be CWID, receiving data from the network, local repeat, etc. Its only purpose is to fix a problem that should not exist in the first place. **THE WINDOWS BASED DISPLAY MIGHT SAY UNDER REPEATER PROGRAMMING PARAMETERS "16-LTR RADIO". THIS WILL BE FIXED IN LATER VERSIONS OF THE PROGRAM.**

NOTE: IN THE EVENT OF AN IP NETWORK INTERRUPTION, THE FLEX IV CONTROLLERS RESUME NORMAL OPERATION IMMEDIATELY UPON RESTORATION OF THE IP NETWORK CONNECTION.

REPEAT RADIO LEVEL

***80RR#17#MMM#**

MMM = 1 - 255

Default = 100

This is the level repeater audio will be transmitted over the radio. If the value is greater than 128, the input level is multiplied by (Repeat Radio Level - 128). If the value is 128 or less, the input level is divided by Repeat Radio Level. As an example, if the Repeat Radio Level is set to 130, the gain is (130 - 128) or 2. If the Repeat Radio Level is set to 4, then the gain is 1 / 4 or .25. Note. Future versions of the software will have the default set to a gain of 1.

TELCO RADIO LEVEL

***80RR#18#MMM#**

MMM = 0 - 255

Default = 200

This is the level that telephone audio will be transmitted over the radio.

RADIO TELCO LEVEL

***80RR#19#MMM#**

MMM = 0 - 255

Default = 200

This is the level radio audio will be sent over the telephone.

NETWORK RECEIVING HANG TIME

***80RR#20#MMM#**

MMM = 0 - 255(seconds)

Default = 255

Determines how long the network connection will stay up if there is no activity from the receiving site's repeater. If set for zero, then there is no time out for the receiving site's repeater.

COS Parameters

COS OR INTERNAL SQUELCH

J = 1 = INTERNAL SQUELCH, J = 0 = COS
It selects the source of the squelch.

***80RR#21#J#**
DEFAULT = 0

COS POLARITY SELECT

J = 1 = positive, J = 0 = negative
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 hysteresis built in.

***80RR#22#J#**
Default = 1

COS TRIGGER VOLTAGE

MMM = 0 - 255
This is the trigger point that will cause the COS to be active. See application note to determine how to calculate the COS trigger voltage.

***80RR#23#MMM#**
Default = 128

COS ACQUISITION TIME

MM = 0 - 99 in 1 millisecond increments
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.

***80RR#24#MM#**
Default = 0

COS RELEASE TIME

MM = 0 - 99 in 10 millisecond increments
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.

***80RR#25#MM#**
Default = 10

Sense Parameters

SENSE POLARITY SELECT

J = 1 = positive, J = 0 = negative
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 hysteresis built in.

***80RR#26#J#**
Default = 1

SENSE TRIGGER VOLTAGE

MMM = 0 - 255

***80RR#27#MMM#**
Default = 128

This is the trigger point that will cause the SENSE to be active. See application note to determine how to calculate the SENSE trigger voltage.

SENSE ACQUISITION TIME

***80RR#28#MM#**

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

***80RR#29#MM#**

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

***80RR#30#MM#**

MM = 2 - 99 in 100 millisecond increments Default = 30
LTR Hold Delay is the amount of time between valid mobile LTR packets before the mobile loses the repeater.

PTT TURN OFF TIME

***80RR#31#MMM#**

MM = 1 - 255 in 10 millisecond increments Default = 26
The time to hold the repeater keyed after a data packet is sent.

REPEATER TIMEOUT

***80RR#32#MMM#**

MM = 0 - 255 in 1 second increments Default = 180
This is mainly to lock out stuck mobile transmitters. This parameter is used in both the LTR and Tone panel operation.

Tone Panel Parameters

ANTI-KERCHUNKING TIME

***80RR#33#MM#**

MM = 01-99, 0 to disable (.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. Program this parameter in increments of 100 milliseconds.

SQUELCH TAIL LENGTH

***80RR#34#MM#**

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 receiver's squelch if set to 0. Program this parameter in increments of 1 millisecond.

CTCSS/DCS HOLD DELAY

***80RR#35#MM#**

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

***80RR#36#MM#**

MM = 0-99 in 100 millisecond increments Default = 30
The delay before busying on sense if "cross-busy" is enabled. Make sure there is enough time to decode an LTR word. If the "cross-busy" is set to zero, then the feature is disabled.

CROSS BUSY HOLD TIME

***80RR#37#MM#**

MM = 0-99 in 100 millisecond increments. Default = 30
Delay before dropping busy after release of sense.

LTR Parameters

LTR SYNC BIT

***80RR#38#J#**

J = 1 = Skip, J = 0 = Non skip. Default = 0
There are nine bits for LTR SYNC. This parameter determines if the program should skip the first bit or not.

PRIORITY LEVEL

***80RR#39#M#**

M = 1-9 Default = 1
If the user is homed to this repeater, the value of "M" determines the user priority number. A user can only trunk to a repeater that has a priority equal to or greater than its assigned priority. This allows the system operator to give certain operators exclusive rights to one or more repeaters as well as the ability to use the other repeaters in the system.

LTR ENCODE POLARITY

***80RR#40#J#**

0 = Normal, 1 = Inverted Default = 0
This parameter corrects transmitted LTR Polarity. This feature is programmable only in the FLEX III-A. It is set with a jumper in the FLEX IV-DSP-D DISPATCH CONTROLLER.

LTR DECODE POLARTIY

***80RR#41#J#**

0 = Normal, 1 = Inverted Default = 0
It corrects received LTR polarity. This feature is programmable only in the FLEX III-A. This is set with a jumper in the FLEX IV-DSP-D DISPATCH CONTROLLER.

TEST ID CODE

***80RR#42#MMM#**

MMM = 001 - 250

Default = 002

This ID code with the home repeater equal to this repeater number will be transmitted continuously to allow alignment of the transmitter.

IDLE MESSAGE TIMER

***80RR#43#MMM#**

MMM = 0 - 255 (1 - 255 Seconds)

Default = 10

Sets the time interval that the idle message will be sent. If set to zero, the idle message will not be sent. Certain radios may need the idle message to work properly. This parameter is in 1 second increments.

AREA BIT

***80RR#44#J#**

J = 0 = Area 0, J = 1 = Area 1

Default = 0

It determines the area for this repeater.

MASTER OR SLAVE

***80RR#45#J#**

J = 0 = Master, J = 1 = Slave.

Default = 1

There can be only one master in the system. The master should be the first physical repeater in the daisy chain and the last and only the last repeater in the daisy chain should have its terminating resistor on the RS485 bus.

CTCSS/DCS Parameters

DCS ENCODE POLARITY

***80RR#46#J#**

J = 0 = Normal, J = 1 = Inverted

Default = 0

It corrects transmitted DCS Polarity. This feature is programmable only in the FLEX III-A. This is set using a jumper in the FLEX IV-DSP-D DISPATCH CONTROLLER.

DCS DECODE POLARTIY

***80RR#47#J#**

J = 0 = Normal, J = 1 = Inverted

Default = 0

It corrects received DCS polarity. This feature is programmable only in the FLEX III-A. This is set using a jumper in the FLEX IV-D DSP DISPATCH CONTROLLER.

COURTESY TONE DELAY

***80RR#48#MM#**

MM = 0- 99 (.01-.99 Seconds)

Default = 10

Delays courtesy beep after the mobile drops its carrier. Program this parameter in increments of 10 milliseconds.

SUBSCRIBER HANG TIME

MM = 0 - 99 (0-9.9 Seconds) ***80RR#49#MM#**
Default = 30
Determines how long the carrier remains on after the CTCSS/DCS drops. Program this parameter in increments of 100 milliseconds.

CARRIER DROP DELAY

MM = 00-99, (0 - .99 Seconds) ***80RR#50#MM#**
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. Program this parameter 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

MM = 0-99, (0-9.9 Seconds) ***80RR#51#MM#**
Default = 10
It is user selectable to add delays to compensate for PTT hang after pressing a DTMF key on mobile OR portable radios. Select a value that allows you to hear all of the return DTMF in programming mode without clipping. Program this parameter in increments of 100 milliseconds.

STATION IDENTIFICATION MODE

J = 0 = BEACON, J = 1 = Activity ***80RR#52#J#**
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.

REPEATER CW ID INTERVAL

MM = 01-99, 0 to disable (1-99 Minutes) ***80RR#54#MM#**
Default = 0
Determines how often the system will send its call sign using voice or Morse code when the system is not in use. Program this parameter in increments of 1 minute. Zero means disabled.

CW ID SPEED

MM = 04-99 (10 Milliseconds for a DI) ***80RR#55#MM#**
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

***80RR#56#MM#**

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

***80RR#57#MMMMMMMMM#**

MMMMMMMMMM

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 DELAY

***80RR#58#MM#**

MM = 0 - 99 (0 - .99 Seconds)

Default = 10

It's the time to wait after keying the repeater before issuing an LTR or DCS code. This delay compensates for any key-up delay in the transmitter. Program this parameter in increments of 10 milliseconds.

COURTESY BEEP FREQUENCY

***80RR#59#MM#**

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

***80RR#60#M#**

M = 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 = Will transmit GOTO information on its channel but will not act as a repeater.

AUX RELAY

***80RR#61#J#**

J = 0 = Not used, J = 1 = follows PTT

Default = 0

It allows the aux relay to be used in place of PTT. It's useful for positive keying, or the current needed exceeds the capacity of the PTT transistor, or the PTT transistor gets fried.

CROSS BUSY MODE

***80RR#62#M#**

M = 0 - 4

Default = 0

If N = 0, Cross Busy is not used for this repeater. The system can process LTR, CTCSS and DCS codes.

If N = 1, the system monitors the Carrier. If Carrier is active and there is no LTR code found, the system will be in Cross Busy mode 1 and it will not become active.

If N = 2, the system monitors the Carrier. If Carrier is active and there is no LTR code found, the system will be in Cross Busy mode 2, and send out GOTO message using the test ID code.

If N = 3, the system looks at the Sense input. If the Sense input is active, the system will be in Cross Busy mode 3 and it will not activate.

If N = 4, the system looks at the Sense input. If the sense input is active, the system will be in Cross Busy mode 4 and keep sending out GOTO message using the test ID code.

For all cross busy modes except 0, only LTR will be processed.

RADIO REPEATER GAIN

***80RR#63#M#**

M = 1 - 9

Default = 1

It acts as an electronic pre-amp for the audio coming from the radio. Effectively increases the repeater gain.

TELCO REPEATER GAIN

***80RR#64#M#**

M = 1 - 9

Default = 1

It acts as an electronic pre-amp for the audio coming from the telephone jack.

Networking Parameters

NETWORK HANG TIME

***80RR#65#MM#**

MM = 00 - 99 (0 - 99 Seconds)

Default = 20

Determines how long the network connection will stay up if there is no activity from either the local repeater or the remote repeater. The network hang time must be set the same at each site. If set for zero, then it's for dispatch mode.

Miscellaneous Parameters

NETWORK ACTIVITY TIME

***80RR#71#MMM#**

MMM = 0 - 255 (0 = Disable)

Default = 0

This parameter is used to free up the repeater at a given site if during a network call the intended party does not answer within a specified time. Lets assume that a network call goes out on five separate repeater sites. If the person to whom the call is intended answers, then the repeater will remain active for the duration of the call while the other repeater sites will disconnect from the network call and be available for local dispatch. If more than one site responds within the specified time, then the additional sites will remain active for the

duration of the call. If the value of this parameter is set to zero, then all sites specified for this call will be active for the duration of the call.

REPEATER INDEX

MM = 0 - 63
Reserved for future use

***80RR#72#MM#**
DEFAULT = 0

REPEATER TYPE

M = 0 - 6
Repeater type defines the configuration of the system. The following defines each of the following types:

***80RR#73#M#**
DEFAULT = 0

1. Conventional: If this repeater type is selected, then the FLEX IV-DSP-D DISPATCH CONTROLLER will be set up to receive and transmit CTCSS, DCS, and LTR type of formats.
2. Console: If this repeater type is selected, then the FLEX IV-DSP-P PUBLIC SAFETY CONTROLLER will be connected and controlled from the console via the four wire balanced audio port.
3. REMOTE: If this repeater type is selected, then the FLEX IV-DSP-D DISPATCH CONTROLLER will work with a repeater that is controlled by the EIA tones.
4. P25:
5. Type 1:
6. Type 2:

IP LOCAL AREA

STORED IN INI FILE

PRIMARY SUBNET MASK

***60RR#01#MMMMMMMMMMMM#**

MMM.MMM.MMM.MMM, MMM = 000 - 255 Default = 000000000000
Depending on the network that has been designed, it is possible to have certain controllers on the local area network and some controllers accessible through a gateway and available on the wide area network. The network mask determines which IP addresses are on the local area network and which IP addresses are on the wide area network.

PRIMARY GATEWAY

***60RR#02#MMMMMMMMMMMM#**

MMM.MMM.MMM.MMM, MMM = 000 - 255 Default = 000000000000
If the controllers you are trying to communicate with are not on the local area network, then the system has to send the IP packets through a gateway to reach the wide area network. This is the IP address of the gateway.

PRIMARY MAC ADDRESS

***60RR##03#MMMMMMMMMMMM#**

MMMMMMMMMMMMMM = 000000000000-FFFFFFFFFFFFFF(HEX) Default = 0000000000
To reach a controller over a local area network it is necessary for each device connected to the network to have a unique address. This unique address is called the MAC (Media Access Controller) address and is stored and used in the Ethernet Controller Integrated Circuit.

SECONDARY IP ADDRESS

***60RR#04#MMMMMMMMMMMM#**

MMM.MMM.MMM.MMM, MMM = 000 - 255 Default = 000000000000
This feature is only supported in the public safety version of the controller. This will only be the device to have two separate IP addresses if you have two separate IP networks.

SECONDARY SUBNET MASK

***60RR#05#MMMMMMMMMMMM#**

MMM.MMM.MMM.MMM, MMM = 000 - 255 Default = 000000000000
This mask determines which IP addresses belong to the local area network and which IP addresses belong to the wide area network for the secondary IP network.

SECONDARY GATEWAY

***60RR#06#MMMMMMMMMMMM#**

MMM.MMM.MMM.MMM, MMM = 000 - 255 Default = 000000000000
This feature is only supported in the public safety version of the controller. This is the IP address for the gateway on the secondary IP network and is only used if the controller you are trying to communicate with is not on the local area network.

SECONDARY MAC ADDRESS

***60RR##07#MMMMMMMMMMM#**

MMMMMMMMMMMM = 000000000000-FFFFFFFFFFFF(HEX) Default = 00000000
The public safety version of the controller has a duplicate Ethernet Controller. This feature will be used in some versions of the product to allow redundant IP networks. Depending on the system, the MAC address may or may not be the same as the primary MAC address.

IP REMOTE AREA

STORED IN INI FILE

IP ADRESS

***70SS#RR#01#MMMMMMMMMMM#**

MMM.MMM.MMM.MMM, MMM = 000 - 255

Default = 000000000000

Each repeater at each site has an IP address. All FLEX IV DSP controllers must be assigned a Static IP address, then the number represents the IP address assigned to the repeater.

IP DTMF CODE

***70SS#RR#02#MMM#**

RESERVED FOR OTHER SPECIAL APPLICATION

IP MODE

***70SS#RR#03#M#**

RESERVED FOR FUTURE USE

IP INDEX

***70SS#RR#04#MM#**

RESERVED FOR FUTURE USE

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 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

July 20, 2006 (Version 1.00) First production Release

Sept 11, 2006 (Version 1.01) Corrected minor typos. Deleted installation procedures and diagnostic modes until next version of manual

December 8, 2006 (Version 1.02) Made the following changes:

1. Repeater Parameter number 20 changed to NETWORK RECEIVING HANG TIME.
2. Repeater Parameter number 43 called Idle message timer changed from increments of 10 seconds to 1 second
3. Repeater Parameter number 17 called Repeat Radio Level redefined
4. CWID speed changed from 1 millisecond per increment to 10 millisecond per increment for a di.

Version 005 of the software has the following major revisions.

1. The microprocessor does not sometimes erase itself when the power is cycled.
2. CWID is implemented
3. The local repeat function delay is changed from about 1 second to about 160 milliseconds
4. Repeater gain is implemented. This will allow the Discriminator input voltage to work from about 50 millivolts to about 3 volts with a repeater output of 100 millivolts to about 3 volts.
5. If network call and if LTR repeater is busy, the network will find an available non busy LTR repeater.

Version 006 of the software has the following major revisions.

1. For local repeaters, the voice delay is reduced from 40 milliseconds to 125 microseconds
2. The DCS level is changed from 33 percent of the LTR level to 80% of LTR level.

Version 007 of the software has the following major revisions.

1. The time for programming the parameters is reduced from 6 minutes to 1 minute.
2. Changed the LTR decode algorithm to make it more reliable.
3. Fixed a problem where the DCS did not cause the remote sites to turn off.

Version 008A of the software has the following enhancements and fixes.

1. Added a function where an external program can be used to monitor the status of the network and the units in your system.
2. Fixed a problem that prevented remote programming of the unit while someone was talking.
3. Added a programmable de-emphasis function to the unit. This change will significantly increase the voice quality if the voice seems tinny.

4. Added a watchdog timer to restart the system if the unit was not initialized properly.

5. Added a watchdog timer to restart the system if the communications between the microprocessor and the DSP fails.

Version 008B of the software has the following enhancements and fixes:

1. If the system stays in an active state more than a user specified time, the system will restart the system. This "user specified time" is 10 second increments between 10 and 2550 seconds. This is parameter 16 in the repeater section.

2. Changed the logic in the communication between the microprocessor and the DSP so the information will be resent if not received the first time.