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## **FLEX III UNIVERSAL CONTROLLER**

**INTERCONNECT DISPATCH SYSTEM  
AA**

**User's Instruction Manual**

Made in U.S.A.

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TABLE OF CONTENT

[SETTING EVERYTHING BACK TO FACTORY DEFAULT](#) ..... 4

[GETTING INTO PROGRAMMING MODE](#)..... 4

[DIAGNOSTIC MODES](#) ..... 5

**[Diagnostic Mode 1](#)** ..... 5

**[Diagnostic Mode 2](#)** ..... 5

[SYSTEM OPERATION](#) ..... 6

**[Placing Outgoing Calls](#)** ..... 6

**[Incoming Calls](#)** ..... 6

**[Talk Cycle](#)** ..... 6

**[Calls Terminations](#)** ..... 7

[GLOBAL PROGRAMMING AREA](#) ..... 8

**[Programming Parameters](#)** ..... 8

**[PROGRAMMING MODE ACCESS CODE](#)**    \*0000#01#J# ..... 8

**[Level Control](#)** ..... 8

**[DTMF TELCO LEVEL](#)**            \*0000#02#MMM# ..... 8

**[DTMF RADIO LEVEL](#)**           \*0000#03#MMM# ..... 8

**[BEEP RADIO LEVEL](#)**           \*0000#04#MMM# ..... 8

**[BEEP TELCO LEVEL](#)**           \*0000#05#MMM# ..... 8

**[TELCO TO RADIO LEVEL](#)**       \*0000#06#MMM# ..... 8

**[RADIO TO TELCO LEVEL](#)**       \*0000#07#MMM# ..... 8

**[RADIO LIMIT LEVEL](#)**         \*0000#08#MMM# ..... 8

**[TONE LEVEL](#)**                 \*0000#09#MMM# ..... 8

**[VOICE RADIO LEVEL](#)**         \*0000#10#MMM# ..... 8

**[VOICE TELCO LEVEL](#)**         \*0000#11#MMM# ..... 9

**[RADIO GAIN](#)**                 \*0000#12#MM# ..... 9

**[TELCO GAIN](#)**                 \*0000#13#MM# ..... 9

**[VOICE GAIN](#)**                 \*0000#14#MM# ..... 9

**[COS/SQUELCH Parameters](#)** ..... 9

**[COS OR INTERNAL SQUELCH](#)**   \*0000#15#J# ..... 9

**[COS POLARITY SELECT](#)**       \*0000#16#J# ..... 9

**[COS TRIGGER VOLTAGE](#)**       \*0000#17#MMM# ..... 9

**[COS ACQUISITION TIME](#)**       \*0000#18#MM# ..... 9

**[COS RELEASE TIME](#)**         \*0000#19#MM# ..... 9

**[Radio Vox Parameters](#)** ..... 9

**[RADIO VOX ACQUISITION TIME](#)**   \*0000#20#MM# ..... 10

**[RADIO VOX RELEASE TIME](#)**   \*0000#21#MM# ..... 10

**[Telco VOX Parameters](#)** ..... 10

**[TELEPHONE VOX ACQUISITION TIME](#)**   \*0000#22#MM# ..... 10

**[TELEPHONE VOX RELEASE TIME](#)**   \*0000#23#MM# ..... 10

**[VOICE DELAY FROM TELEPHONE](#)**   \*0000#24#MM# ..... 10

**[Operation Mode Selection](#)** ..... 10

**[OPERATING MODE](#)**           \*0000#25#M# ..... 10

**[TONE ACQUISITION TIME](#)**       \*0000#26#MM# ..... 11

**[TONE RELEASE TIME](#)**         \*0000#27#MM# ..... 11

**[General Dispatch Parameters](#)** ..... 11

**[RADIO CONNECT CODE](#)**       \*0000#28#MMMMMM# ..... 11

**[RADIO DISCONNECT CODE](#)**     \*0000#29#MMMMMM# ..... 11

**[TELCO CONNECT CODE](#)**       \*0000#30#MMMMMM# ..... 11

**[TELCO DISCONNECT CODE](#)**     \*0000#31#MMMMMM# ..... 11

**[TURN ON DELAY](#)**           \*0000#32#MMM# ..... 11

**[TURN OFF DELAY](#)**           \*0000#33#MM# ..... 11

**[DTMF CHARACTER TIME](#)**       \*0000#34#MM# ..... 11

**[RADIO COURTESY BEEP](#)**       \*0000#35#J# ..... 12

**[TELCO COURTESY BEEP](#)**       \*0000#36#J# ..... 12

**[Incoming Calls](#)** ..... 12

**[AUTO-ANSWER RING NUMBER](#)**   \*0000#37#N# ..... 12

**[RING SPACE](#)**             \*0000#38#MM# ..... 12

**[RING ANSWER](#)**             \*0000#39#N# ..... 12

<u>RING DETECT</u> <u>*0000#40#MMM#</u> .....	12
<b><u>Voice Message Prompt</u></b> .....	13
<u>STATION IDENTIFICATION</u> <u>*0000#41#N#</u> .....	13
<u>STATION IDENTIFICATION MODE</u> <u>*0000#42#N#</u> .....	13
<u>VOICE MESSAGE FOR LAND CALLS</u> <u>*0000#43#N#</u> .....	13
<u>VOICE MESSAGE FOR MOBILE CALLS</u> <u>*0000#44#N#</u> .....	13
<u>DISCONNECTION MESSAGE</u> <u>*0000#45#N#</u> .....	13
<b><u>Disconnection Conditions</u></b> .....	13
<u>TIMEOUT TIMER</u> <u>*0000#46#MM#</u> .....	13
<u>VOX ACTIVITY</u> <u>*0000#47#MM#</u> .....	13
<u>BUSY SIGNAL DISCONNECT</u> <u>*0000#48#J#</u> .....	13
<u>BUSY DISCONNECT CYCLES</u> <u>*0000#49#N#</u> .....	13
<u>DIAL TONE DISCONNECT</u> <u>*0000#50#J#</u> .....	14
<u>DIAL DISCONNECT TIME</u> <u>*0000#51#MM#</u> .....	14
<u>LINE CURRENT DISCONNECT</u> <u>*0000#52#N#</u> .....	14
<u>LINE DELAY</u> <u>*0000#53#MM#</u> .....	14
<u>LINE DISCONNECT TIME</u> <u>*0000#54#MM#</u> .....	14
<u>STAR DELAY TIME</u> <u>*0000#55#MM#</u> .....	14
<u>MORSE CODE LEVEL</u> <u>*0000#56#MMM#</u> .....	14
<u>SPEED DIAL NUMBER AREA</u> .....	15
<u>VOICE PROMPT AREA</u> .....	15

### **SETTING EVERYTHING BACK TO FACTORY DEFAULT**

If for some reason it is necessary to set the system back to factory default, plug a telephone into the programming jack in back of the unit and enter the command `***123456**`. If the system is enabled to accept programming command from other sources such as over the radio, this command is valid from those sources too. You cannot disable the factory reset from working over the local programming jack.

### **GETTING INTO PROGRAMMING MODE**

This product allows the user to unconditionally get into programming mode by pressing `*123456#` from the telephone attached to the programming jack in the back of the unit.

It also allows the user to dial up the Flex, and get into programming mode by pressing `*123456#` from the phone. While it is in the programming mode, the command for read data will enable the system to send Morse Code to the phone line. The format is as following:

1.Global Parameters:

`"00" + "two digit line number" + "-" + "the value of the parameter"`.

2.Telephone Number Area:

`"4" + "three digit memory index" + "-" + "phone number"`.

## DIAGNOSTIC MODES

### Diagnostic Mode 1

By putting a jumper into JP6, the system will allow the user to determine the value to set the SENSE and COS inputs as well as adjust the squelch pot if COS is not used. When in this mode, the display will look as follows:

```
SQUE  COS  SENSE
OFF   137  235
```

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

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

### Diagnostic Mode 2

By putting a jumper into JP5, the system will allow the user to determine if the system is decoding DTMF properly. The bottom line of the display will be used for recording DTMF tones from the radio and the top line will be used for recording DTMF tones from the programming jack in the rear of the unit.

## SYSTEM OPERATION

### Placing Outgoing Calls

Once phone numbers have been programmed into EEPROM, simply press CCC\*RR for AA or CCCRR for AE from the mobile DTMF keypad, where CCC are the access code for the radio and RR are the speed dialing numbers in SPEED DIAL AREA.

The system compares the DTMF string to the memory. If there is a match, you will hear a voice prompt (SPEED DIAL MESSAGE parameter 44) which indicates the unit is currently dialing. If the answer is from a regular phone, the system will wait for the access code (TELCO CONNECT CODE parameter 30). After the phone side inputs correct access code, the system will go into the talk cycle in Vox control mode. If the tone console answers, the system will enable the tone generator in the console by sending it two DTMF Stars, detect the tone, then it will go into the talk cycle in the tone control mode.

### Incoming Calls

For an incoming call, the system will answer the phone with a voice prompt (VOICE MESSAGE ON CONNECT parameter 43). At the end of the message, the system will wait for the access code if the call is from a regular phone or will enable the tone generator if the call is from a tone console. If there is the access code found (TELCO CONNECT CODE parameter 30), or the tone generator has been enabled, the system will go into the talk cycle and put into VOX mode for a regular phone or put into tone control mode for the tone console.

### Talk Cycle

Under simplex operation, the land side and the radio side can not talk at same time. The system can generate a momentary beep when land side or radio side stops transmitting. And it is time for another side to start speaking. The parameter 35 and 36 allow you to enable or disable the features.

In VOX control mode, the VOX from telephone will trigger the radio transmitting the telephone audio. When the person on the telephone stops speaking, the system is now ready to receive a message from the mobile.

In tone control mode, the tone 2175 Hz or 2300 Hz from the telephone side will trigger the radio transmitting the telephone audio. There is built-in filter to block the tone from telephone side to the radio side. When the tone on the phone side stops, the system will wait the message from the mobile.

The parameter 25 named OPERATING MODE is for the Radio transmitting condition. When it is set to 1, no tone will send to the radio from the Flex III. If it is set to 2, the Flex III will send 2175 Hz alone with the audio to the radio. If it is set to 3, the Flex III will send 2300 Hz alone with the audio to the radio.

### **Calls Terminations**

As the end of the call, if you set station identification message for disconnection, the system will send station id message to both phone side and radio side. Then a voice prompt (parameter 45) will indicate the call has been terminated. The system will go to stand by mode.

For manually ending a call, you just can press ##.

Timeout timer: calls will automatically be disconnected at the end of the time you set which is the parameter 46.

VOX disconnect timer: If the system does not see any activity from the telephone side and the radio side, the call will be automatically be terminated. It is defined by the parameter 47.

The system will detect the busy tone, dial tone and line cut. They can be enabled or disabled individually. Programming allows customizing call progress tone detection to operate on most telephone systems. Please see parameters 48,50 and 52.

## GLOBAL PROGRAMMING AREA

### Programming Parameters

PROGRAMMING MODE ACCESS CODE \*0000#01#J#  
MMMMMM = 000000-999999 Default = 123456  
Code must be precisely six digits. This code is used to enter the programming mode from all sources.

### Level Control

DTMF TELCO LEVEL \*0000#02#MMM#  
MMM = 0 - 255 Default = 100  
This is the level the DTMF will be transmitted over the telephone line.

DTMF RADIO LEVEL \*0000#03#MMM#  
MMM = 0 - 255 Default = 0  
This is the level the DTMF will be transmitted over the radio. Used for remote programming.

BEEP RADIO LEVEL \*0000#04#MMM#  
MMM = 0 - 255 Default = 50  
This is the level annunciating beeps will be heard over the radio.

BEEP TELCO LEVEL \*0000#05#MMM#  
MMM = 0 - 255 Default = 50  
This is the level annunciating beeps will be heard over the telephone.

TELCO TO RADIO LEVEL \*0000#06#MMM#  
MMM = 0 - 255 Default = 200  
This is the level telephone audio will be transmitted over the radio.

RADIO TO TELCO LEVEL \*0000#07#MMM#  
MMM = 0 - 255 Default = 255  
This is the level radio audio will be sent over the telephone.

RADIO LIMIT LEVEL \*0000#08#MMM#  
MMM = 0 - 255 Default = 255  
This is the maximum level the repeater or the telephone audio will be transmitted over the radio.

TONE LEVEL \*0000#09#MMM#  
MMM = 0 - 255 Default = 20  
This is the level the tone will be transmitted over the radio.

VOICE RADIO LEVEL \*0000#10#MMM#  
MMM = 0 - 255 Default = 200  
This is the level the voice prompts will be heard over the radio.



VOICE TELCO LEVEL \*0000#11#MMM#  
MMM = 0 - 255 Default = 200  
This is the level the voice prompts will be heard over the telephone.

RADIO GAIN \*0000#12#MM#  
MM = 1 - 16 Default = 1  
This is a digital preamp for the audio coming from the radio in case the audio has to be changed remotely or the level is too low.

TELCO GAIN \*0000#13#MM#  
MM = 1 - 16 Default = 1  
This is a digital preamp for the audio coming from the telephone line in case the audio has to be changed remotely or the level is too low.

VOICE GAIN \*0000#14#MM#  
MM = 1 - 16 Default = 1  
This is a digital preamp for the audio coming from the voice storage chip in case the audio has to be changed remotely or the level is too low.

### **COS/SQUELCH Parameters**

COS OR INTERNAL SQUELCH \*0000#15#J#  
J = 1 = INTERNAL SQUELCH, J = 0 = COS DEFAULT = 0  
Selects the source of the squelch.

COS POLARITY SELECT \*0000#16#J#  
J = 1 = positive, J = 0 = negative Default = 1  
If set for a positive voltage, then any voltage above the COS Trigger Voltage will set COS true. If 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.

COS TRIGGER VOLTAGE \*0000#17#MMM#  
MMM = 0 - 255 Default = 10  
This is the trigger point that will cause the COS to be active.

COS ACQUISITION TIME \*0000#18#MM#  
MM = 0 - 99 in 1 millisecond increments Default = 0  
This parameter is the time COS must be valid before the system will consider the signal is valid. This is to prevent noise from triggering the system

COS RELEASE TIME \*0000#19#MM#  
MM = 0 - 99 in 10 millisecond increments Default = 10  
This parameter is the time COS must be invalid before the system will consider the signal no longer valid. This is to prevent picket fence signals from distorting the system.

### **Radio Vox Parameters**

RADIO VOX ACQUISITION TIME \*0000#20#MM#  
MM = 0 - 99 in 1 millisecond increments Default = 0  
This parameter is the time Radio VOX must be valid before the system will consider the signal is valid. This is to prevent noise from trigger the system.

RADIO VOX RELEASE TIME \*0000#21#MM#  
MM = 0 - 99 in 100 millisecond increments Default = 10  
This parameter is the time Radio VOX must be invalid before the system will consider the signal no longer valid. This is to prevent temporary lapses in conversation from changing the mode. The default Radio VOX Release Time is 1 second.

### **Telco VOX Parameters**

TELEPHONE VOX ACQUISITION TIME \*0000#22#MM#  
MM = 0 - 99 in 1 millisecond increments Default = 10  
This parameter is the time Telephone VOX must be valid before the system will consider the signal is valid. This is to prevent noise from trigger the system.

TELEPHONE VOX RELEASE TIME \*0000#23#MM#  
MM = 0 - 99 in 100 millisecond increments Default = 5  
This parameter is the time Telephone VOX must be invalid before the system will consider the signal no longer valid. This is to prevent temporary lapses in conversation from changing the mode. The default Telephone VOX Release time is 1 second.

VOICE DELAY FROM TELEPHONE \*0000#24#MM#  
MM = 0 - 40 Delay in 10 millisecond increments Default = 40  
Sets the amount of voice delay in 10 millisecond increments from the telephone line to the radio. The default Voice Delay From Telephone is 400 milliseconds.  
In VOX mode, word clipping or word loss is directly proportional to radio T/R speed in simplex systems and repeater pick up time when used through repeaters. The slower the system, the more desirable voice delay becomes.  
The voice delay electronically delays audio originating from the telephone by 0 to .4 second. This in effect means that the transmitter has been keyed for .4 second before the audio even began! This timing makes word loss virtually impossible.  
The voice delay is essential when using the Flex Series Controller through repeaters from a Control Station. It is also recommended for use in straight VOX simplex mode operation especially when connected to a slow switching base station radio.

### **Operation Mode Selection**

OPERATING MODE \*0000#25#M#  
M = 1 - 3 Default = 1  
This parameter determines the Radio mode. It is as follows:

- 1 = No tone transmitted to the radio.
- 2 = 2175 tone transmitted to the radio.
- 3 = 2300 tone transmitted to the radio.

TONE ACQUISITION TIME \*0000#26#MM#  
MM = 0 - 255 in 1 millisecond increments Default = 200  
This parameter is the time COS must be valid before the system will consider the signal is valid. This is to prevent noise from trigger the system

TONE RELEASE TIME \*0000#27#MM#  
MM = 0 - 255 in 100 millisecond increments Default = 15  
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.

### General Dispatch Parameters

RADIO CONNECT CODE \*0000#28#MMMM#  
MMMM Default = 529  
It is the radio access code, also called airport code. Enter blank for no access code operation. Otherwise enter a one digit to six digits connect code.

RADIO DISCONNECT CODE \*0000#29#MMMM#  
MMMM Default = blank  
It is not used. The disconnect code is ##.

TELCO CONNECT CODE \*0000#30#MMMM#  
MMMM Default= 8669  
It is the phone access code for a regular phone call. Enter blank for no access code operation. Otherwise enter a one digit to six digit connect code.

TELCO DISCONNECT CODE \*0000#31#MMMM#  
MMMM Default= blank  
It is not used. The disconnect code is ##.

TURN ON DELAY \*0000#32#MMM#  
NN = 0 - 255 IN 10 mS increments Default = 10  
This is the time the transmitter will be on before the message is retransmitted. This is to allow the transmitter to warm up so the first part of the message is not lost. The Turn On Delay default is 100 milliseconds.

TURN OFF DELAY \*0000#33#MM#  
MM = 0 - 99 in 10 mS increments Default = 10  
This is the time the transmitter will be left on after the message is sent. This is to prevent squelch tail noise to be injected immediately after the end of the message. The Turn Off Delay default is 100 milliseconds.

DTMF CHARACTER TIME \*0000#34#MM#  
MM = 5 - 99 in 100 mS increments Default = 50  
This is maximum time between DTMF characters to accept the character as part of the access code. The default DTMF Character Time is 5 seconds.

RADIO COURTESY BEEP \*0000#35#J#  
J = 1 = Enable, J = 0 = Disable Default = 0  
If enabled, the system will generate a momentary beep when the telephone side stops transmitting and its time for the radio side to start speaking.

TELCO COURTESY BEEP \*0000#36#J#  
J = 1 = Enable, J = 0 = Disable Default = 0  
If enabled, the system will generate a momentary beep when the radio side stops transmitting and its time for the telephone side to start speaking.

### Incoming Calls

AUTO-ANSWER RING NUMBER \*0000#37#N#  
N = 0 = Disable, 1 - 9 Rings Default = 2  
Selects which incoming ring initiates auto-answer. Enter 1-9 or enter 0 to disable. If auto-answer is set to a greater number of rings than ringout you can have ordinary ringout alerts until auto-answer occurs. After auto-answer, remote base, selective calling or talk back paging can be initiated from any telephone.

RING SPACE \*0000#38#MM#  
MM = 0 - 99 seconds in 100 milliseconds increment Default = 80  
This parameter is the time that if exceeded will indicate to the system that the ringing has stopped. Normally the ringing cycle is one second of ringing followed by three seconds of no ringing. If the time from ring to ring is exceeded, then the auto answer ring number function will have to start over. If the auto answer ring number is set to a one, then this parameter will have no effect. The Ring Space default is 9.9 seconds.

RING ANSWER \*0000#39#N#  
N = 0 Leading Edge, 1 = Trailing Edge Default = 0  
It selects if the ring answer will be on the leading edge of the ring cycle or the trailing edge of the ring cycle. If set to the leading edge, the system will be able to be answered in a fraction of a second after the ringing starts. The exact time determined by the Ring Detect parameter below. If set to the trailing edge, the telephone line relay will close when there is minimal voltage across the contacts.

RING DETECT \*0000#40#MMM#  
MMM = Minimum number of transitions Default = 10  
The ringing signal provides a transition at the Opto isolator at the ringing frequency. The ringing signal is typically between 16 to 64 Hz. This parameter detects how many transitions are needed in a given ring cycle before the ring signal will be deemed valid.  
By setting the number to a small value and setting the ring answer to the leading edge, the system can respond to a ring in less than 250 milliseconds.

## Voice Message Prompt

STATION IDENTIFICATION \*0000#41#N#  
N = 0 - 7 Default = 0  
If station identification is enabled, this parameter defines what voice message number to use.

STATION IDENTIFICATION MODE \*0000#42#N#  
N = 0 - 3 Default = 1  
If it is 0, there is no station identification. If it is 1, then station identification is on disconnection only. If it is 2, station identification is on connection only, if it is three, station identification is on both connection and disconnection.

VOICE MESSAGE FOR LAND CALLS \*0000#43#N#  
N = 0 - 7 Default = 1  
When set to 0, will not generate any voice messages on phone call answering, otherwise the number is the voice message number.

VOICE MESSAGE FOR MOBILE CALLS \*0000#44#N#  
N = 0 - 7 Default = 2  
When set to 0, will not generate any voice messages. If the number is set between 1 and 7, then that is the voice message number to be used to transmit over the air before a speed call.

DISCONNECTION MESSAGE \*0000#45#N#  
N = 0 - 7 Default = 3  
When it is 0, it will not generate any voice messages. If the number is set between 1 and 7, then that is the voice message number to be used to transmit over the air and telephone line before the call is terminated.

## Disconnection Conditions

TIMEOUT TIMER \*0000#46#MM#  
MM = 0 - 99 in minute increments Default = 5  
It sets the maximum call limit time. A value of 0 disables the feature. The Timeout Timer default is 3 minutes.

VOX ACTIVITY \*0000#47#MM#  
MM = 0 - 99 in 1 minute Increments Default = 0  
This feature determines how long the system will stay connected if there is no VOX from either the telephone or the radio. If set for 0, the function is disabled.

BUSY SIGNAL DISCONNECT \*0000#48#J#  
J = 1 = Enable, J = 0 = Disable Default = 1  
If enabled, a busy signal will disconnect the phone patch. If disabled, busy signal is ignored.

BUSY DISCONNECT CYCLES \*0000#49#N#  
N = 2 - 9 in 100 mS increments Default = 7  
This is the number of busy cycles for the system to disconnect if the busy signal disconnect parameter is enabled.

DIAL TONE DISCONNECT \*0000#50#J#  
J = 1 = Enable, J = 0 = Disable Default = 1  
If enabled, a dial tone will disconnect the phone patch. If disabled, dial tone is ignored.

DIAL DISCONNECT TIME \*0000#51#MM#  
MM = 20 - 99 in 100 mS increments Default = 70  
This is the time the dial tone must be active for the system to disconnect if the dial tone disconnect parameter is enabled.

LINE CURRENT DISCONNECT \*0000#52#N#  
N = 0 - 2 Default = 1  
Most phone systems will give a loss of loop current or line reversal when the phone at the far end hangs up. This is more reliable than waiting for dial tone or busy signal to generate disconnection.  
0 = Disable  
1 = Disconnect on loss of loop current  
2 = Disconnect on line reversal

LINE DELAY \*0000#53#MM#  
MM = 0 - 99 in 10 millisecond increment Default = 99  
This parameter is the time after the line relay has been pulled in to the line is steady as indicated by a constant current in the line sense detectors. The Line Delay default is 990 milliseconds.

LINE DISCONNECT TIME \*0000#54#MM#  
MM = 0 - 99 in 1 millisecond increment Default = 5  
This parameter is the time the loss of loop current must be stable to indicate it's a real disconnect and not just a momentary glitch. The Line Disconnect Time default is 5 milliseconds.

STAR DELAY TIME \*0000#55#MM#  
MM = 0 - 99 in 1 second increment Default = 4  
This parameter is the time delay between the Flex finishes sending telephone number and the Flex starts sending the star to enable the tone mode.

MORSE CODE LEVEL \*0000#56#MMM#  
MM = 0 - 255 Default = 50  
This parameter is the level for the Flex sending the Morse Code to the phone line while the phone side is in programming mode.

\*NOTE: In the programming mode, for display the settings only, the commands will use \* to replace # after you input the line number. For example, to display PROGRAMMING MODE ACCESS CODE, the command is \*0000#01\*. To display LINE DISCONNECT TIME, the command is \*0000#54\*.

## SPEED DIAL NUMBER AREA

The speed dial number area is used to program parameters relating to the mobile speed dialing. In this phone patch operation, only the speed dial number can be used for the mobile to call the land line.

The general form of this area is \*40nn#01#MRRNNNNNNNNNNNNNNNN#, where the 40 indicates the area is speed dialing and the nn corresponds to the speed dial number position in memory. The user inputs MRR following by the phone number.

If M is 1, it is for AA. And if M is 2 it is for AE.  
RR is the bank number used by the mobile speed dialing.

As an example, \*4011#01#12218056429635# would indicate in the eleventh speed dial number position there is a phone number 18056429635 for the AA mobile to speed dial by pressing LAX\*22. \*4011#01#22218056429635# would indicate in the eleventh speed dial number position there is a phone number 18056429635 for the AE mobile to speed dial by pressing LAX22. LAX is the radio access code, also called airport code.

## VOICE PROMPT AREA

The voice prompt area is used to enter a voice message.

For recording, the format used is \*7000#n#. The value n corresponds to one of the eight voice memory locations whose maximum record time is as follows:

<u>N</u>	<u>Maximum Record Time</u>
0	9 seconds
1	9 seconds
2	9 seconds
3	9 seconds
4	9 seconds
5	25 seconds
6	25 seconds
7	25 seconds

The total record time for this product is two minutes.

To play back, use the command \*7000#n\*

When recording, the system will stop recording either when the maximum time has been reached or the user enters any DTMF key, or the user stops speaking for a second.