

Programming Advanced Features

4

Some of the MaxTrac models have the ability to be programmed for advanced features. These features include Channel Scan, Handset Muting, Expanded Accessory Connector, MDC-1200, Quik-Call II, DTMF and STAR. Expanded Accessory Connector is available with option B308 and Signaling Options. Signaling Options (B833, B561 and B835) will allow access to all of the signaling formats. Note that both the Expanded Options Connector and Signaling are standard on 32-channel models.

Note: Channel scan is available only in 16- and 32-channel models.

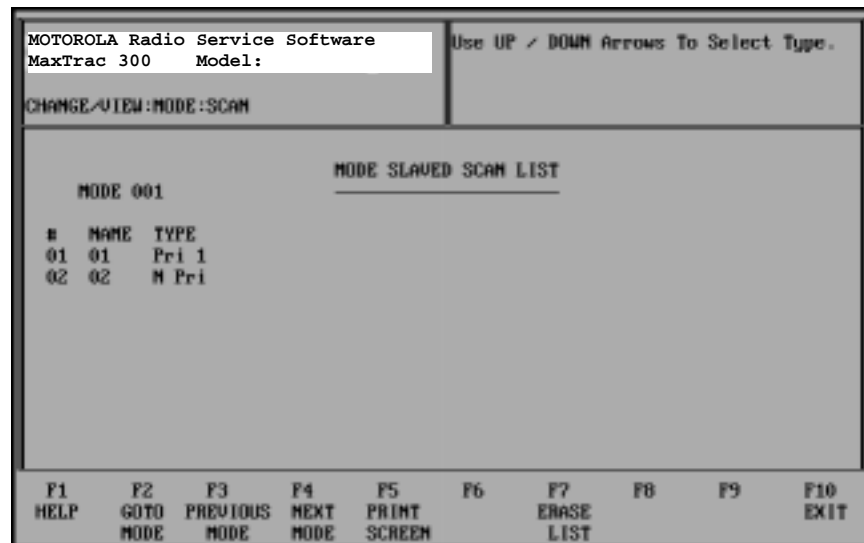
The procedures required to program advanced features are detailed in the following pages.

Programming Mode-Slaved Scan Lists



The MaxTrac 300 radio has a scan list assigned to each mode of the radio. The list can have up to 32 receive channels depending on the model. On 32-channel models, if more than 16 receive channels are selected in the list, a possibility of missing the beginning of a transmission may exist. If selected by the operator, two channels can be scanned as priority channels. The first priority is always the selected mode that is displayed on the radio before the scanner is turned on. The second priority, talk-back scanning, and priority look-back speed are radio wide and are assigned on the RADIO WIDE CONFIGURATION screen.

In order to view or change a Mode-Slaved Scan List, you must be in the MODE CONFIGURATION screen first. Next, select the master mode you want to view or change and press **F6**. The MODE SLAVED SCAN LIST screen will be displayed. This screen lists the available slave modes and their scan TYPE for the selected master mode.



The scan types are changed by moving the cursor with the **Enter** or **Tab** keys to the desired slave mode. The slave mode can be changed to a blank or “N Pri” using the up/down arrow keys. “N Pri” means that the mode is in a non-priority frequency and a blank means it is not in the scan list.

The First and Second Priority Modes (Pri 1 & Pri 2) are displayed on the screen but cannot be changed. Note that Priority One (Pri 1) is always the master mode number. Also, the Second Priority cannot be changed on this screen. It is a radio wide parameter and can only be changed on the RADIO WIDE CONFIGURATION screen. There are also five active function keys on this screen.

F2 - Go To Mode

This function allows you to go to the Mode-Slaved Scan List you want to modify without returning to the MODE CONFIGURATION screen and stepping through the modes in-between. Press **F2** to move the cursor to the Mode Number data field. Type the desired mode and press **Enter**. The screen will now change to the desired Mode-Slaved Scan List.

F3 & F4 - Previous and Next Mode

The **F4** function will advance the screen to the next Mode-Slaved Scan List. If you are at the last mode in the radio, **F4** will take you to Mode 1. **F3** will return you to the previous mode. If you are at Mode 1, **F3** will take you to the last mode in the radio.

F5 - Print Screen

The **F5** function will send the currently displayed Mode-Slaved Scan List to the printer.

F7 - Erase List

Press **F7** to remove all the modes from the current scan list. When this is done, the scanner will not operate in Mode-Slaved Scan.

F10 will return you to the MODE CONFIGURATION screen.

Programming the Second Priority Channel



The data field to change the second priority is found on the RADIO WIDE CONFIGURATION screen.

MOTOROLA Radio Service Software MaxTrac 300 Model:					Use UP / DOWN Arrows To Enable.				
CHANGE/VIEW-RADIO WIDE									
RADIO WIDE CONFIGURATION									
MODEL INFORMATION					OPTIONS (Cont.)				
PSIMJ99945_K.....60 WATT					ZONE/MODE DISPLAY.....DISABLED				
LOW BAND.....42.0 - 50.0 MHz					PRIORITY 2 SCAN MODE.....OFF				
SQUELCH.....Coded					PRIORITY SAMPLING RATE.....SLOW				
CONVENTIONAL MODES.....32					SCAN TALK BACK.....N				
SERIAL NUMBER.....8093ALUWH					EMERGENCY ALARM.....NONE				
OPTIONS					ACC. INTERNAL.....NONE				
TIME OUT TIMER.....960					ACC. EXTERNAL... PUBLIC ADDRESS				
HANDSET.....N					ACC. CUSTOM.....N				
OFF HOOK FL/DPL.....N									
F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
HELP	MORE			PRINT				OTHER	EXIT
	RAD WIDE			SCREEN				ACCESSRY	

At the RADIO WIDE CONFIGURATION screen, move the cursor to the Priority Two Scan Mode field using the **Enter** or **Tab** keys. You may now enter the mode number for the desired second priority, or you may enter 'OFF' which will remove the second priority. You may also use the up/down arrow keys to select the desired mode. Pressing **Enter** or moving to a new field will enter the new mode. If the mode is invalid, you will be prompted for a valid value.

Programming Talk Back and Home Revert Operation



The conventional channel scan has the ability to revert to the home mode (home revert) or stay on the busy channel (talk-back) when the microphone is removed from the hang-up clip. These capabilities are now programmable from the RSS. The default is home revert. The data field to revert to talk-back scan is found on the RADIO WIDE CONFIGURATION screen.

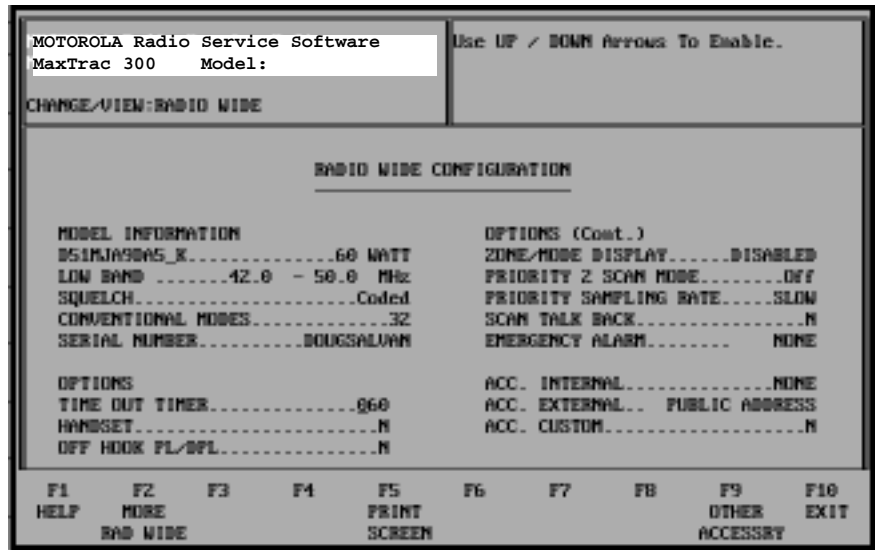
MOTOROLA Radio Service Software MaxTrac 300 Model:					Use UP / DOWN Arrows To Enable.				
CHANGE/VIEW:RADIO WIDE									
<u>RADIO WIDE CONFIGURATION</u>									
MODEL INFORMATION					OPTIONS (Cont.)				
BSIMJ90AS_K	.60 WATT				ZONE/MODE DISPLAY	.DISABLED			
LOW BAND	.42.0 - 50.0 MHz				PRIORITY 2 SCAN MODE	.OFF			
SQUELCH	.Coded				PRIORITY SAMPLING RATE	.SLOW			
CONVENTIONAL MODES	.32				SCAN TALK BACK	.N			
SERIAL NUMBER	.DOUGSALVAN				EMERGENCY ALARM	.NONE			
OPTIONS					ACC. INTERNAL				
TIME OUT TIMER	.060				ACC. EXTERNAL	.PUBLIC ADDRESS			
HANDSET	.N				ACC. CUSTOM	.N			
OFF HOOK PL/DPL	.N								
F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
HELP	MORE			PRINT				OTHER	EXIT
	RAD WIDE			SCREEN				ACCESSRY	

Move the cursor to the Scan Talk Back field. Use the up/down arrow keys to select "N" for home revert scan and "Y" for talk-back scan.

Programming the Priority Sample Rate



When the channel scan is stopped on a non-priority channel, it periodically “looks back” at the priority channel for activity. The rate at which this “look back” occurs is the priority sample rate. There are two rates available, slow and fast. Slow is equivalent to 1.5 seconds between “look backs” and Fast is equivalent to 0.5 seconds between “look backs”. The default is Slow. The data field to change the priority sample rate is found on the RADIO WIDE CONFIGURATION screen.



At the RADIO WIDE CONFIGURATION, move the cursor to the Priority Sample Rate data field and use the up/down arrow keys to select the desired rate.

Programming for Handset Operation



When a handset is connected to the radio, it must recognize the connection in order to mute the loudspeaker. The loudspeaker is muted when the handset is removed from the hang-up cup. The data field to change the radio for handset operation is found on the RADIO WIDE CONFIGURATION screen.

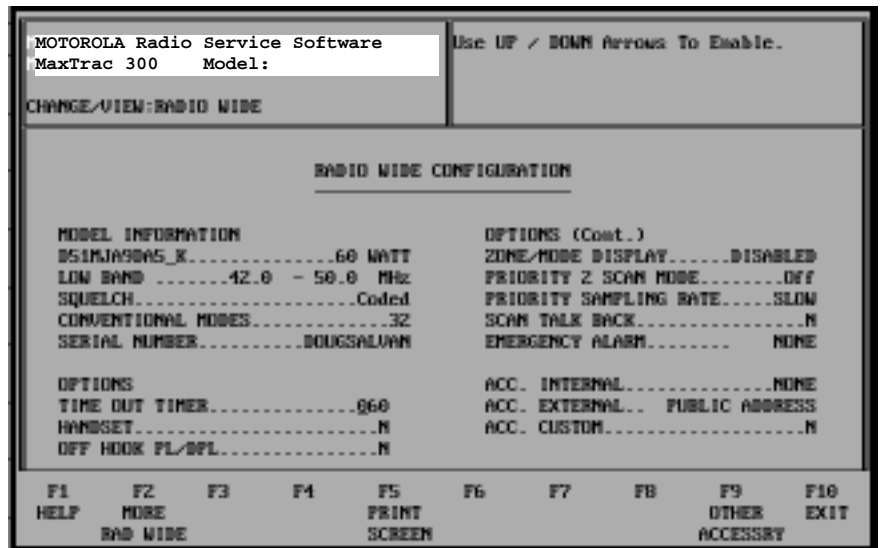
MOTOROLA Radio Service Software					Use UP / DOWN Arrows To Enable.				
MaxTrac 300 Model:									
CHANGE/VIEW:RADIO WIDE									
RADIO WIDE CONFIGURATION									
MODEL INFORMATION					OPTIONS (Cont.)				
BSIMJASDAS_K.....60 WATT					ZONE/MODE DISPLAY.....DISABLED				
LOW BAND .....42.0 - 50.0 MHz					PRIORITY 2 SCAN MODE.....OFF				
SQUELCH.....Coded					PRIORITY SAMPLING RATE.....SLOW				
CONVENTIONAL MODES.....32					SCAN TALK BACK.....N				
SERIAL NUMBER.....BOUGSALUWH					EMERGENCY ALARM.....NONE				
OPTIONS					ACC. INTERNAL.....NONE				
TIME OUT TIMER.....960					ACC. EXTERNAL.. PUBLIC ADDRESS				
HANDSET.....N					ACC. CUSTOM.....N				
OFF HOOK FL/BPL.....N									
F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
HELP	MORE			PRINT				OTHER	EXIT
	RAD WIDE			SCREEN				ACCESSRY	

At the RADIO WIDE CONFIGURATION screen, move the cursor to the Handset data field and use the up/down arrows to select “N” for no handset operation and “Y” for handset operation.

Programming Zone/Mode Control Head Display



MaxTrac 300 conventional models support a Zone/Mode display in place of the standard mode display. Bring up the RADIO WIDE CONFIGURATION screen.



Move the cursor to the Zone/Mode Display field using the **Enter** or **Tab** keys. Now use the up/down arrow keys to enable/disable this option. This option can support a maximum of 32 modes. The RSS will always reference the actual mode number of the radio, not the zone/mode combination that will be displayed on the control head. For example, RSS mode 1 will correspond to radio mode A1 (as displayed on the control head), RSS mode 18 will correspond to radio mode C2, and so on. To convert from RSS mode to zone/mode combinations, use the following table:

RSS Modes	Zone/Mode Combinations
1 - 8	A1 - A8
9 - 16	B1 - B8
17 - 24	C1 - C8
25 - 32	D1 - D8
33 - 40	E1 - E8
41 - 48	F1 - F8
49 - 56	G1 - G8
57 - 64	H1 - H8
65 - 72	I1 - I8
73 - 80	J1 - J8
81 - 88	L1 - L8
89 - 96	N1 - N8
97 - 99	O1 - O3

Mode Name Aliasing



Radios that have the Signaling (B833, B561, B835) or Accessory Connector (B308) options have the ability to have an alias mode number displayed on the front panel. The displayed number can be changed from 01 to 99 using the NAME data field on the MODE CONFIGURATION screen.

```
MOTOROLA Radio Service Software      Enter Frequency In MHz. Ex: 451.6500
MaxTrac 300      Model:
CHANGE/VIEW:MODE

MODE CONFIGURATION
MODE 002
NAME.....02
TYPE.....Conventional
Rx FREQUENCY.....451.65000
Tx FREQUENCY.....451.65000

Rx SQUELCH Type.....TPL
Rx SQUELCH Code.....192.8 7A

Tx SQUELCH Type.....DPL
Tx SQUELCH Code.....031

F1    F2    F3    F4    F5    F6    F7    F8    F9    F10
HELP  GOTO  PREVIOUS  NEXT  PRINT  SCAN  MODE  MODE  MODE  EXIT
      MODE  MODE  MODE  SCREEN  LIST  UTILITY
```

Use the up/down arrow keys or enter the number directly.

Note: Zone/Mode and Mode Name Aliasing (see below) are compatible. If Mode 2 is aliased as mode name 49, the Zone/Mode feature will display this mode as G1.

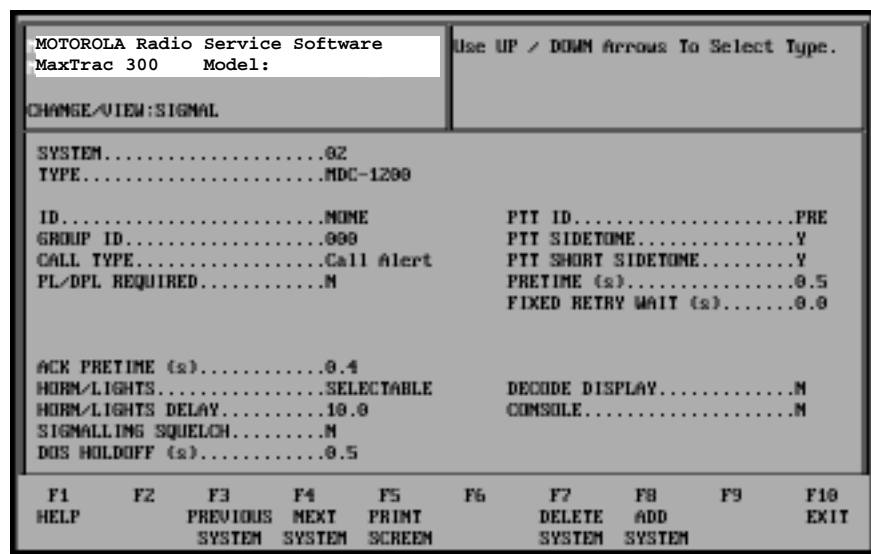
Signaling (B833, B561, B835)

The Signaling option allows you to create 32 different signaling systems that are then slaved to a receive or transmit frequency. There are four signaling formats available: MDC-1200, Quik-Call II, DTMF and STAR. Each signaling system has a number of variable parameters that may be changed on the SIGNALING CONFIGURATION screen. In most cases, the default values will not have to be changed. A description of each parameter and how it affects the each signaling format is given below.

MDC-1200



MDC-1200 is a Motorola-proprietary signaling format. It is a binary format using a 1200-baud Minimum Shift Keying modulation. The following features are available with MDC-1200: Data-Operated Squelch (DOS), Radio Check, PTT-ID, Emergency Alarm, Call Alert, Voice Selective Call and Horn and Lights Alarm.



Descriptions of the parameters used in an MDC-1200 system are given below.

ID

Each format requires that the radio have an ID number. This number should be unique to the radio's system. The ID is a four-digit hexadecimal number for MDC-1200. The default for this data field is the last four digits of the radio's serial number.

Group ID

If you want the radio to respond to group call signals, a Group ID is required. This ID is a three-digit hexadecimal which must match the Group ID of the rest of the radios in the group. The default Group ID is "000".

Call Type

Call Alert lets a caller leave a "page" in an unattended vehicle so that when the operator returns to the radio, he will become aware that he must return the call. There are two types of Call Alert available. Standard Call Alert just leaves an indication on the radio that a call has been made. Call Alert with Voice also leaves an indication, but in addition unmutes the speaker for a voice message. The default for Call Type is Call Alert. Radio Check and Voice Selective Call are separate functions which are always enabled.

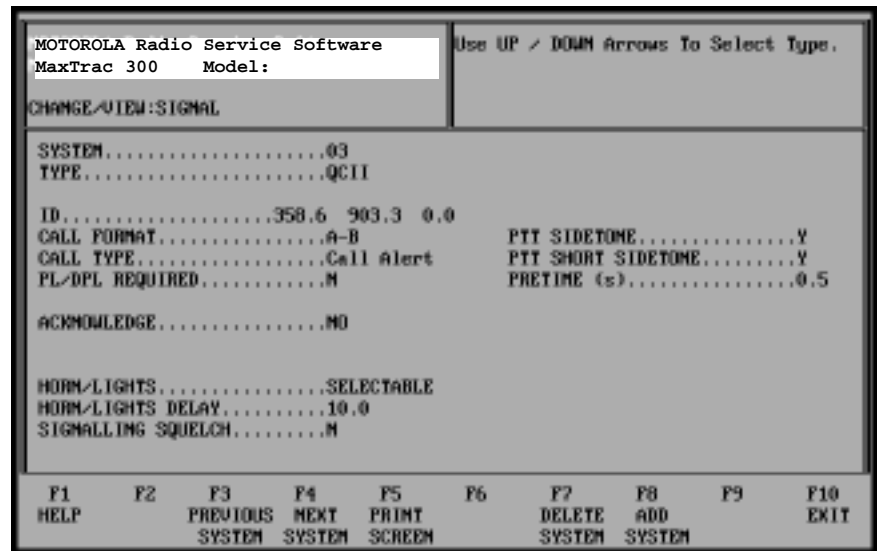
PL/DPL Required	When PL/DPL required is “Yes”, the correct PL/DPL must be detected by the radio before any action is taken. This means that even when the correct ID is received, the radio will not respond if the PL/DPL is wrong. This is a useful feature if there are co-channel users who use the same signaling format.
PTT-ID	The ID of the radio can be transmitted at the beginning of the transmission, at the end of a transmission, or both. If enabled, PTT sidetones are heard by the operator when the ID is being transmitted.
PTT Sidetone	PTT sidetones are used when PTT-ID is activated. Sidetones are heard through the speaker when the operator first presses the PTT. They are used to tell the operator that he cannot begin speaking until the ID has been transmitted. There are two sidetones available in MaxTrac radios. The PTT-ID Sidetone is a continuous tone heard from PTT until the ID has been sent.
PTT Short Sidetone	The second tone, PTT Short Sidetone, is a short beep after the ID has been sent. Both tell the operator when he is permitted to speak into the microphone. One, both or no sidetones may be activated.
Pretime	Pretime is the delay between the time that the operator pushes the PTT key to the time that the ID is actually transmitted. This delay is required in order to allow the radio to completely open the communications path through repeaters or other system components. The default pretime is 0.5 seconds. The pretime can vary from 0.1 to 4.2 seconds in 0.1-second increments.
Fixed Retry Wait	When Emergency, Call Alert or Radio Check is activated by the operator, the radio expects an acknowledge message from the receiving radio. If no acknowledge is received, the radio will repeat the message sequence after a fixed time. Fixed Retry Wait is the time the radio waits between message tries. The default is 0.0 seconds. The wait time can be between 0.0 and 16.9 seconds in 0.4-second increments.
ACK Pretime	Systems that use Call Alert require that the radio acknowledge (ACK) that Call Alert has been received. ACK Pretime is the delay between the time that the radio receives a Call Alert to the time that it starts the ACK sequence. The default ACK pretime is 0.4 seconds. The range is 0.2 to 2.0 seconds in 0.1-second increments.
Horn/Lights	If the system requires Horn/Lights for Call Alerts, this feature must be activated in the radio to allow the operator to turn Horn/Lights on. If enabled, the Horn/Lights feature may be permanently armed or operator selected. On MaxTrac 50 or 100 radios that lack a select button, Permanent is the only choice and an external on/off switch is required for the Horn/Lights relay. The default is no (N) Horn/Lights.
Horn/Lights Delay	When External Alarm or Horn/Lights is activated by the operator, Call Alerts will activate the external alarm for seven seconds. Horn/Lights Delay will delay the activation of the external alarm to allow the operator time (if he is in the vehicle) to respond to the Call Alert before the external alarm is activated. If the operator responds during the delay time, the external alarm will not be activated. The default time is 10.0 seconds. Other available choices are 0, 5.0, 10.0 and 15.0 seconds.

Signaling Squelch	<p>If the operator desires that his speaker unmutes only for Call Alerts or Voice Selective Call, Signaling Squelch should be activated. If activated, Signaling Squelch will mute all channel traffic unless preceded by a Call Alert or Voice Selective Call. These calls can be individual or group calls. Note the Call Type should be set to "Call Alert with Voice". Like Private-Line, Signaling Squelch can be disabled by pressing the monitor button or by removing the microphone from the hang-up clip.</p>
DOS Holdoff	<p>Data Operated Squelch (DOS) is used with MDC-1200 to mute the data transmissions to reduce operator annoyance. DOS attempts to mute the speaker when data is present on the channel. DOS Holdoff keeps the speaker muted for a preset time from the time that carrier is detected by the squelch circuit. This allows DOS sufficient time to detect any data activity, further reducing the annoyance of data being heard from the speaker. The default holdoff is 0.5 seconds. The range is 0.0 to 4.2 seconds in 0.1-second increments.</p>
Decode Display	<p>When a PTT-ID transmission is received by the radio, it contains the ID of the transmitting radio. The entry name will be displayed on the two-digit display of the radio when Decode Display is enabled. The received ID must be in the Call List. Otherwise, a "to" will be displayed on the radio.</p>
Console (Control Unit)	<p>One radio in the system should be designated as the Console Radio (Control Unit). The purpose of this radio is to acknowledge receipt of an Emergency Alert. If the Console data field is enabled ("Y"), the radio will respond to an Emergency with an acknowledge transmission.</p>

Quik-Call II



Quik-Call II is a two-tone sequential signaling system. It is widely used in portables and pagers. The features available with Quik-Call are: Call Alert, Voice Selective Call, and Horn and Lights Alarm. Given below are descriptions of the parameters used with a Quik-Call system.



ID Tones

Three tones are available to create an ID for the radio. The tones are designated as tones A, B and C. Any frequency between 304 and 2470 Hz may be used. Standard Quik-Call tones should be used. Tones that are closer together in frequency than the standard may impair system performance. Tones in the range of 288.5 Hz to 304.0 Hz may be programmed but should be used with caution. Contact Product Services for special instructions on using these tones. When the radio is used as an encoder, tones between 67 Hz and 3062 Hz may be used.

Call Format

Once the tones are determined, they may be transmitted in various orders. The radio will respond to the following sequences: A-B, A-C, C-B, Long B, and Long C.

Call Type

There are three Call Types available: Call Alert, Call Alert with Voice and Voice Selective Call. Call Alert lets a caller leave a “page” in an unattended vehicle. When the operator returns to the radio, he will become aware that he should return the call. Standard Call Alert simply leaves an indication on the radio that a call has been made. Call Alert with Voice leaves such an indication, but also unmutes the speaker for a voice message. Voice Selective Call unmutes the loudspeaker for a voice message, but does not leave any indication of a call. The default for Call Type is Call Alert.

PL/DPL Required

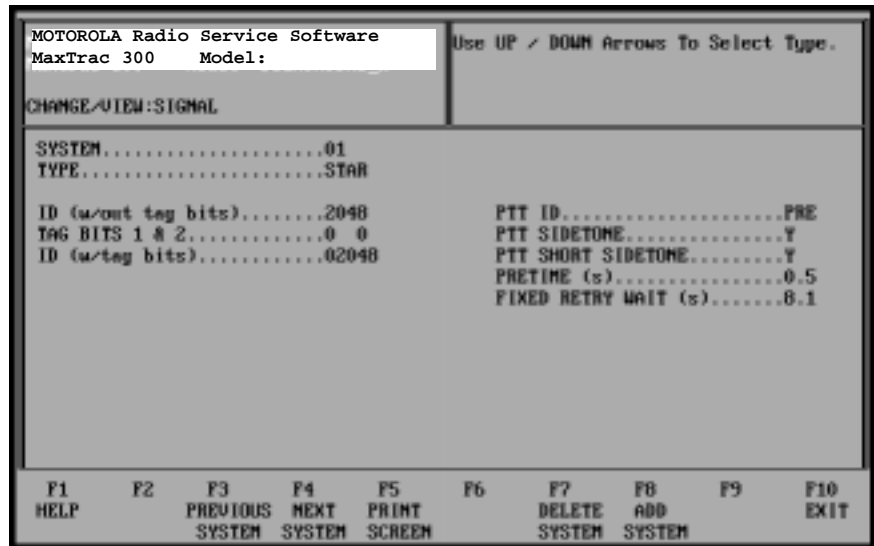
When PL/DPL required is “Yes”, the correct PL/DPL must be detected by the radio before any action is taken. This means that if the PL/DPL is wrong, the radio will not respond even though the correct ID is received. This feature is useful when there are co-channel users who use the same signaling format.

Acknowledge	A transpond tone is transmitted by a radio receiving the matching A-B tones as an acknowledge. The transpond transmitted is a fixed tone and requires that the TX signaling system be a Quik-Call II signaling format. The Acknowledge default is no (“N”) acknowledge.
ACK Pretime	Systems that use Call Alert may require that the radio acknowledge (ACK) receipt of the Call Alert. ACK Pretime is the delay from the time that the radio receives a Call Alert to the time that it actually starts the ACK tone. The default ACK pretime is 0.5 seconds. The ACK pretime can range from 0.2 to 2.0 seconds in 0.1-second increments.
Horn/Lights	If the system requires Horn/Lights for Call Alerts, this feature must be activated in the radio to allow the operator to turn Horn/Lights on. If enabled, the Horn/Lights feature may be permanently armed or operator selected. On MaxTrac 50 or 100 radios that lack a select button, permanent is the only choice available and an external on/off switch is required for the Horn/Lights relay. The default is no Horn/Lights.
Horn/Lights Delay	When External Alarm or Horn/Lights is activated by the operator, Call Alerts will activate the external alarm for seven seconds. Horn/Lights Delay will delay the activation of the external alarm to allow the operator (if he is in the vehicle) time to respond to the Call Alert before the external alarm is activated. If the operator responds during the delay time, the external alarm will not be activated. The default time is 10.0 seconds. Other available default times are 0, 5.0, 10.0 and 15.0 seconds.
Signaling Squelch	If the operator desires that his speaker unmutes only for Call Alert or Voice Selective Call, Signaling Squelch should be activated. If activated, Signaling Squelch will mute all channel traffic unless signals are preceded by a Call Alert or Voice Selective Call. These calls can be either individual or group calls. Note that the Call Type should be set to “Call Alert with Voice” or “Voice Selective Call”. As with Private Line, Signaling Squelch can be disabled by pressing the monitor button or removing the microphone from the hang-up clip.

STAR System



The STAR system is compatible with STAR and Coded Communications STAR Signaling Systems. The MaxTrac radio provides PTT-ID and Emergency encode features.



ID

The STAR System requires that each radio have a unique four-digit ID number. The default for this data field is blank. The two tag bits can be used to add an extension to the ID if multiple users share the channel.

PTT-ID

The ID of the radio can be transmitted at the beginning of the transmission, at the end of a transmission, or at both times. If this field is enabled, the operator can hear the PTT sidetones when the ID is being transmitted.

PTT Sidetones

PTT sidetones are used when PTT-ID is activated. Sidetones are heard through the speaker when the operator first presses the PTT. They are used to tell the operator that he cannot begin speaking until the ID has been transmitted. There are two sidetones available in the MaxTrac. The PTT-ID Sidetone is a continuous tone heard from PTT until the ID has been sent. The second tone, PTT Short Sidetone, is a short beep after the ID has been sent. Both tell the operator when he can begin speaking into the microphone. One, both or no sidetones maybe activated.

Pretime

Pretime is the delay from the time that the operator pushes PTT to the time that the ID is transmitted. This delay is required in order to allow the radio to completely open the communications path through repeaters or other system components. The default pretime is 0.5 seconds. The pretime can range from 0.1 to 4.2 seconds in 0.1-second increments.

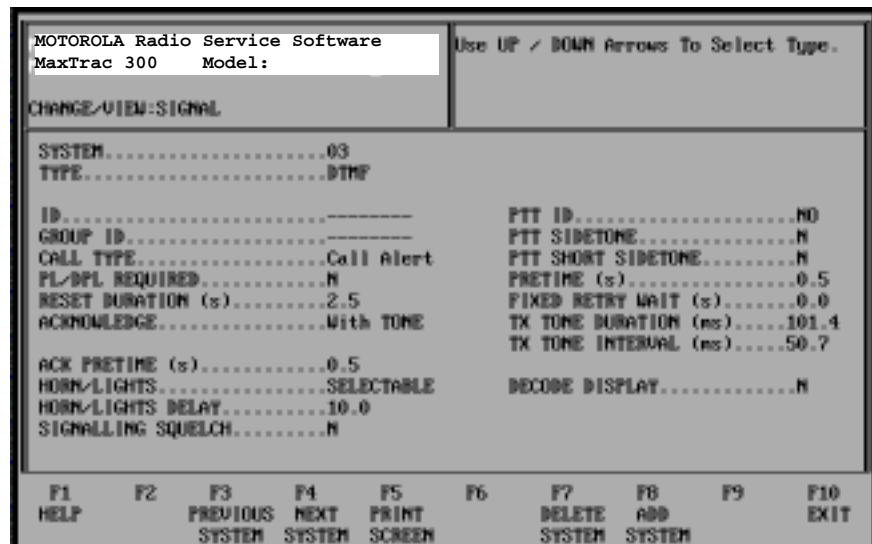
Fixed Retry Wait

When Emergency, Call Alert or Radio Check is activated by the operator, the radio expects to receive an acknowledge from the receiving radio. If no acknowledge is received, the radio will repeat the message sequence after a fixed time. Fixed Retry Wait is the time that the radio waits between message tries. The default is 8.1 seconds. The wait time can range from 0.0 seconds to 16.9 seconds in 0.4-second increments.

DTMF



DTMF is short for Dual-Tone Multiple Frequency signaling format. It is widely used in the telephone industry. The features available with DTMF are PTT-ID (ANI), Call Alert Selective Call and Horn and Lights Alarm. The features available in a DTMF system are described below.



```
MOTOROLA Radio Service Software
MaxTrac 300 Model:
Use UP / DOWN Arrows To Select Type.

CHANGE/VIEW: SIGNAL

SYSTEM.....03
TYPE.....DTMF

ID.....
GROUP ID.....
CALL TYPE.....Call Alert
PL/DPL REQUIRED.....N
RESET DURATION (s).....2.5
ACKNOWLEDGE.....With TONE

ACK PRETIME (s).....0.5
HORN-LIGHTS.....SELECTABLE
HORN-LIGHTS DELAY.....10.0
SIGNALLING SQUELCH.....N

PTT ID.....NO
PTT SIDETONE.....N
PTT SHORT SIDETONE.....N
PRETIME (s).....0.5
FIXED RETRY WAIT (s).....0.0
TX TONE DURATION (ms).....101.4
TX TONE INTERVAL (ms).....50.7
DECODE DISPLAY.....N

F1 F2 F3 F4 F5 F6 F7 F8 F9 F10
HELP PREVIOUS NEXT PRINT DELETE ADD EXIT
SYSTEM SYSTEM SCREEN SYSTEM SYSTEM
```

ID DTMF requires that the radio have an ID number. This number should be unique to the radio's system. The ID is a one- to eight-digit number. The default for this data field is blank.

Group ID If you want the radio to respond to group call signals, a Group ID is required. This ID is one to eight digits long. The group ID cannot have more digits than the radio ID. There is no default for this field.

Call Type There are three Call Types available: Call Alert, Call Alert with Voice and Voice Selective Call. Call Alert lets a caller leave a “page” in an unattended vehicle. When the operator returns to the radio, he will be aware that he should return the call. Standard Call Alert simply leaves a indication on the radio that a call has been made. Call Alert with Voice also leaves an indication, but in addition unmutes the speaker for a voice message. Voice Selective Call unmutes the loudspeaker for a voice message, but does not leave any indication of a call. The default for Call Type is Call Alert.

Acknowledge A transpond is transmitted by a receiving radio as an acknowledge. The transpond may be the radio's ID, a DTMF digit or a fixed tone. The default for Acknowledge is “With Tone”.

ACK Pretime Systems that use Call Alert may require that the radio acknowledge (ACK) receipt of the Call Alert. ACK Pretime is the delay between the time that the radio receives a Call Alert to the time that it starts the ACK sequence. The default ACK pretime is 0.5 seconds. The ACK Pretime can range from 0.2 to 2.0 seconds in 0.1-second increments.

PL/DPL Required When PL/DPL required is “Yes”, the correct PL/DPL must be detected by the radio before any action is taken. This means that if the PL/DPL is wrong, the radio will not respond even if the correct ID is received. This feature is useful when there are co-channel users who use the same signaling format.

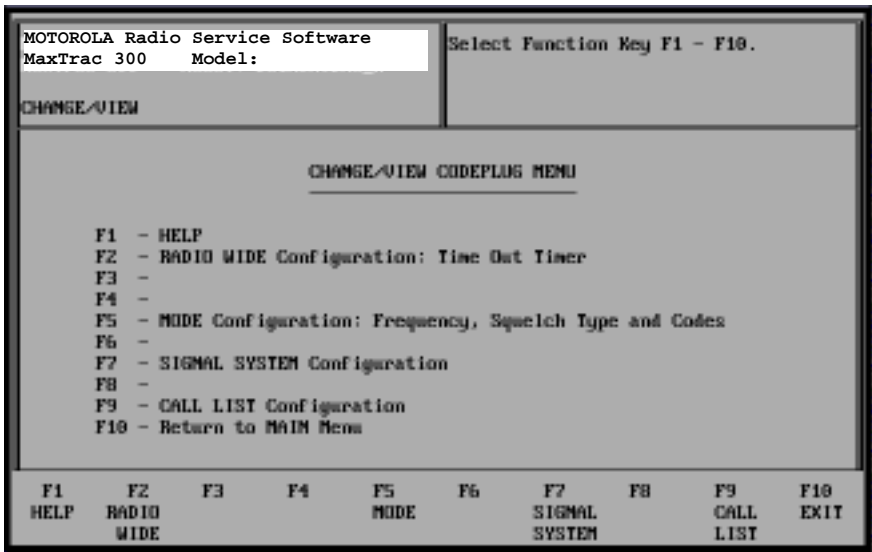
PTT-ID	The ID of the radio can be transmitted at the beginning of the transmission, at the end of a transmission, or at both times. If enabled, the operator can hear the PTT sidetones when the ID is being transmitted.
PTT Sidetone	PTT sidetones are used when PTT-ID is activated. Sidetones are heard through the speaker when the operator first presses the PTT. They are used to inform the operator that he cannot speak until the ID has been transmitted. There are two sidetones available in the MaxTrac. The PTT-ID Sidetone is a continuous tone heard from PTT until the ID has been sent.
PTT Short Sidetone	The second tone, PTT Short Sidetone, is a short beep after the ID has been sent. Both tell the operator when he is permitted to speak into the microphone. One, both or no sidetones maybe activated.
Pretime	Pretime is the delay between the time that the operator pushes PTT to the time that the ID is transmitted. This delay is required in order to allow the radio to completely open the communications path through repeaters or other system components. The default pretime is 0.5 seconds. The pretime can range from 0.1 to 4.2 seconds in 0.1-second increments.
Fixed Retry Wait	When Call Alert is activated by the operator, the radio expects an acknowledge from the receiving radio. If no acknowledge is received, the radio will repeat the message sequence after a fixed time. Fixed Retry Wait is the time the radio waits between message tries. The default is 0.0 seconds. The wait time can range from 0.0 seconds to 16.9 seconds in 0.4-second increments.
Horn/Lights	If the system requires Horn/Lights for Call Alerts, this feature must be activated to allow the operator to turn Horn/ Lights on. If enabled, the Horn/Lights feature may be permanently armed or operator selected. On MaxTrac 50 or 100 radios that lack a select button, permanent is the only choice available and an external on/off switch is required for the Horn/Lights relay. The default is no ("N") Horn/Lights.
Horn/Lights Delay	When External Alarm or Horn/Lights is activated by the operator, Call Alerts will activate the external alarm for seven seconds. Horn/Lights Delay will delay the activation of the external alarm to allow the operator (if he is in the vehicle) time to respond to the Call Alert before the external alarm is activated. If the operator responds during the delay time, the external alarm will not be activated. The default time is 10.0 seconds. Other available choices are 0, 5.0, 10.0 and 15.0 seconds.
Signaling Squelch	If the operator desires that his speaker unmutes only for Call Alerts or Voice Selective Call, Signaling Squelch should be activated. If activated, Signaling Squelch will mute all channel traffic unless preceded by a Call Alert or Voice Selective Call. These calls can be individual or group calls. Note that the Call Type should be set to "Call Alert with Voice" or "Voice Selective Call". As with Private-Line, Signaling Squelch can be disabled by pressing the monitor button or by removing the microphone from the hang-up clip.

Reset Duration	After the DTMF decoder has received a valid digit, it waits a predetermined time for the next expected tone before resetting. Resetting causes the decoder to look for the first digit of the ID. Reset Duration is the time period that the decoder waits before resetting. This duration may be set from 0.2 to 33.0 seconds. The default is 2.5 seconds.
TX Tone Duration	TX Tone Duration is the length of each digit that is transmitted by the radio. The default duration is 101.4 ms. This duration may range from 50.7 to 4296 ms.
TX Tone Interval	TX Tone Interval is the time between the transmission of different DTMF digits. The duration may be set from 50.7 to 4286 ms. The default is 50.7 ms.

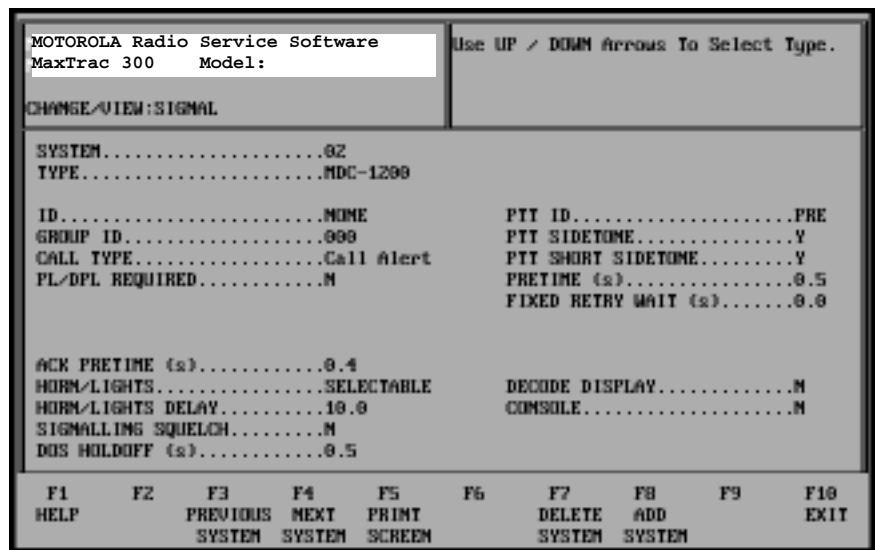
Defining a Signaling System



After a codeplug has been read from a radio or an archive file, move to the CHANGE/VIEW MENU to activate the Signaling System.



The **F7** function in the CHANGE/VIEW MENU displays the SIGNAL SYSTEM CONFIGURATION screen. This screen allows you to activate or deactivate the desired signaling system and also configure the system to match the signaling system where the radio will be used. Use of this screen and its function keys are described next.



The **F4** function will advance the screen to the next Signaling System. If you are at the last System, **F4** will display System 01. **F3** will return you to the previous Signaling System. If you are at System 01, **F3** will display the last enabled System.

Pressing **F5** will send information on the currently displayed Signaling System to the printer.

Pressing **F7** function key will delete the currently displayed system. Systems below the deleted system on the list will be moved up.

Note: When system numbers are adjusted by a delete, the assignments of system numbers to Modes and Call Lists are NOT adjusted and must be changed manually.

Pressing **F8** will add a new system block to the radio's codeplug image. The initial state of the new system will be "MDC-1200".

Selecting a System

There are 32 systems available. They are numbered 01 through 32. Use **F3** and **F4** to select the desired system number. To add a new system, press **F8**. To delete a system, press **F7**.

Signaling Type Selection

Move the cursor to the TYPE data field. There are four system types available. They are MDC-1200, Quik-Call II, DTMF and STAR. System types are selected using the up/down arrow keys. You will also note that some of the parameter data fields will disappear when formats are changed. Only the relevant data fields will appear for each format.

Entering Signaling Format Parameters

Each format has its own set of operating features and parameters. Each parameter is adjusted using the up/down arrow keys or by keyboard entry. Some parameters have defaults which, in most cases, do not have to be changed. The tables on the following pages show the relevant parameter choices for each format. The choices may be selected on the screen by moving the cursor to the desired data field and using the up/down arrow keys. Use these tables to choose the correct parameters for the system.

MDC-1200 System Parameters

Data Field	Data Choices	Description
ID	DEEE	Four-digit hexadecimal number unique to each radio.
GROUP ID	EEE	Three-digit hexadecimal number common to the talkgroup.
CALL TYPE	Call Alert Call Alert w/Voice	Call Alert leaves a call indication at the receiving radio. Call Alert with Voice leaves a call indication and unmutes the loudspeaker of the receiving radio.
PL/DPL REQUIRED	Y N	Correct PL/DPL is required to receive MDC-1200 data. PL/DPL is not required to receive MDC-1200 data.
ACK PRETIME	0.2 to 2.0 sec.	Delay before acknowledging after receiving valid MDC-1200 data. DEFAULT 0.5 sec.
HORN/LIGHTS	Selectable Permanent N	Selectable Horn/Lights may be defeated by front panel select button. Permanent Horn/Lights cannot be defeated without an external switch in the relay cable. Horn/Lights cannot be activated.
HORN/LIGHTS DELAY	0, 5, 10, 15 sec.	Horn and Lights relay is delayed by the specified time after a valid call to the radio has been made. DEFAULT 10 sec.
SIGNALING SQUELCH	Y N	The front panel monitor button can be used to put the radio into Signaling Squelch. Signaling Squelch is not activated.
DOS HOLDOFF	0 to 4.3 sec.	Delays the unmuting of the speaker when carrier is present to allow the Data Operated Squelch to detect a data burst. DEFAULT 0.5 sec.
PTT-ID	PRE POST BOTH NO	The radio will transmit the ID at the beginning of a transmission. The radio will transmit the ID at the end of the transmission. The radio will transmit the ID at the beginning and end of a transmission. The ID of the radio will not be transmitted on a microphone PTT.
PTT SIDETONE	Y N	This sidetone is used as a talk prohibit tone. It starts at the beginning of a transmission and ends when the ID has been transmitted. No sidetone will be heard on PTT.
PTT SHORT SIDETONE	Y N	This sidetone is used as a talk permit tone. It will be heard as a beep after the ID has been transmitted. No Short Sidetone will be heard on PTT.
PRETIME	0.1 to 4.3 sec.	This is the time between PTT and the transmission of the ID. This is to allow repeaters to become active and to account for any other system delays. DEFAULT 0.5 sec.
FIXED RETRY WAIT	0.0 to 6.9 sec.	This is the time delay between Emergency, Call Alert and Radio Check retries. DEFAULT 0.0 sec.
DECODE DISPLAY	Y N	IDs of transmitting radios will be displayed on the front panel. IDs will not be displayed.
CONSOLE	Y N	Will allow the radio to acknowledge an Emergency Alert. Radio will not Acknowledge an Emergency Alert.

Quik-Call System Parameters

Data Field	Data Choices	Description
ID	Tones A, B, C	Tone Frequencies from 304.0 to 2470.0 Hz. At least two tones are required and should be unique to the radio.
CALL FORMAT	A-B A-B/A-C A-B/C-B A-B/Long B A-B/Long-C A-B/A-C/ Long C A-B/Long B/ Long C A-B/A-C/ Long B/ Long C	Tone A followed by Tone B. Tone A followed by Tone B, or Tone A followed by Tone C. Tone A followed by Tone B, or Tone C followed by Tone B. Tone A followed by Tone B or Long Tone B. Tone A followed by Tone B or Long Tone C. Tone A followed by Tone B, or Tone A followed by Tone C, or Long Tone C. Tone A followed by Tone B or Long Tone B or Long Tone C. Tone A followed by Tone B, or Tone A followed by Tone C or Long Tone B or Long Tone C.
CALL TYPE	Call Alert Call Alert w/Voice Voice Sel Call	Call Alert leaves call indication at receiving radio. Call Alert with Voice leaves call indication and unmutes the loudspeaker of the receiving radio. Unmutes loudspeaker on receiving radio, but does not leave any call indication.
PL/DPL REQUIRED	Y N	Correct PL/DPL required to receive Quik-Call II. PL/ DPL not required to receive Quik-Call II.
ACKNOWLEDGE	Y N	An Acknowledge Transpond tone will be sent after a valid call. No Acknowledge will be sent after a valid call.
ACK PRETIME	0.2 to 2.0 sec.	Delay before acknowledging after receiving valid Quik-Call II ID. DEFAULT 0.5 sec.
HORN/LIGHTS	Selectable Permanent N	Selectable Horn/Lights may be defeated by front panel select button. Permanent Horn/Lights cannot be defeated without an external switch in relay cable. Horn/Lights cannot be activated.
HORN/LIGHTS DELAY	0, 5, 10, 15 sec.	Horn and Lights relay is delayed by the specified time after a valid call to the radio has been made. DEFAULT 10 sec.
SIGNALING SQUELCH	Y N	The front panel monitor button can be used to put the radio into Signaling Squelch. Signaling Squelch is not activated.

DTMF System Parameters

Data Field	Data Choices	Description
ID	0 to 9, *, #	One to 8 digits may be entered for a unique radio ID. Digits 0 to 9, *, and # may be used.
GROUP ID	0 to 9, *, #	One to 8 digits may be entered for a group ID. Digits 0 to 9, * and # may be used. The number of group digits may not exceed the number of ID digits.
CALL TYPE	Call Alert Call Alert/Voice Voice Sel Call	Call Alert leaves call indication at receiving radio. Call Alert with Voice leaves a call indication and unmutes the loudspeaker of the receiving radio. Unmutes loudspeaker on receiving radio; does not leave any call indication.
PL/DPL REQUIRED	Y N	Correct PL/DPL required to receive DTMF data. PL/DPL not required to receive DTMF data.
RESET DURATION	0.2 to 33.0 sec.	The time interval between DTMF digits before decoder resets. DEFAULT 2.5 sec.
ACKNOWLEDGE TYPE	DIGIT ID TONE NO	One DTMF digit will be transmitted after a valid call. Digit is entered on Acknowledge Digit data field. The ID of the radio will be transmitted after a valid call. A predetermined Tone will be transmitted after a valid call. No Acknowledge will be sent after a valid call.
ACKNOWLEDGE DIGIT	0 to 9, *, #	One digit may be entered when the Acknowledge Type is "DIGIT".
ACK PRETIME	0.2 to 2.1 sec.	Delay before acknowledging after receiving valid DTMF. DEFAULT 0.5 sec.
HORN/LIGHTS	Selectable Permanent N	Horn/Lights may be defeated by front panel select button. Horn/Lights cannot be defeated without an external switch in relay cable. Horn/Lights cannot be activated.
HORN/LIGHTS DELAY	0, 5, 10, 15 sec.	Horn and Lights relay is delayed by the specified time after a valid call to the radio has been made. DEFAULT 10 sec.
SIGNALING SQUELCH	Y N	The front panel monitor button can be used to put the radio into Signaling Squelch. Signaling Squelch is not activated.
PTT-ID	PRE POST BOTH NO	The radio will transmit the ID at the beginning of a transmission. The radio will transmit the ID at the end of the transmission. The radio will transmit the ID at the beginning and end of a transmission. The ID of the radio will not be transmitted on a microphone PTT.
PTT SIDETONE	Y N	This sidetone is used as a talk prohibit tone. It starts at the beginning of a transmission and ends when the ID has been transmitted. No sidetone will be heard on PTT.
PTT SHORT SIDETONE	Y N	This sidetone is used as a talk permit tone. It will be heard as a beep after the ID has been transmitted. No Short Sidetone will be heard on PTT.

DTMF System Parameters

Data Field	Data Choices	Description
PRETIME	0.1 to 4.3 sec.	This is the time between PTT and the transmission of the ID. This is to allow repeaters to become active and to account for any other system delays. DEFAULT 0.5 sec.
FIXED RETRY WAIT	0.0 to 16.9 sec.	This is the fixed time delay between Encode retries. DEFAULT 0.0 sec.
DECODE DISPLAY	Y N	IDs of transmitting radios will be displayed on the front panel. IDs will not be displayed.
TX TONE DURATION	50.7 to 4296 ms.	This duration is the length of time each digit is transmitted. DEFAULT 101.4 ms.
TX TONE INTERVAL	50.7 to 4296 ms.	This interval is the time between each digit during transmission. DEFAULT 50.7 ms.

STAR System Parameters

Data Field	Data Choices	Description
ID	0000 to 4092	Four decimal Digit ID number unique to each radio.
TAG BITS	0 or 1	Extension to Four decimal Digit ID.
PTT ID	PRE POST BOTH NO	The radio will transmit the ID at the beginning of a transmission. The radio will transmit the ID at the end of the transmission. The radio will transmit the ID both at the beginning and end of a transmission. The ID of the radio will not be transmitted on a microphone PTT.
PTT SIDETONE	Y N	This sidetone is used as a talk prohibit tone. It starts at the beginning of a transmission and ends when the ID has been transmitted. No sidetone will be heard on PTT.
PTT SHORT SIDETONE	Y N	This sidetone is used as a talk permit tone. It will be heard as a beep after the ID has been transmitted. No short sidetone will be heard on PTT.
PRETIME	0.1 to 4.3 sec.	This is the time delay between PTT and the transmission of the ID. This is to allow repeaters to become active and to account for any other system delays. DEFAULT 0.5 sec.
FIXED RETRY WAIT	0.0 to 16.9 sec.	This is the time delay between Emergency retries. DEFAULT 0.0 sec.

Programming Radio Wide Signaling Features

Encode features are programmed on a radio-wide basis. The available features are Emergency Alarm, Voice Selective Call, Call Alert and Radio Check.

Programming Emergency Alarm



Emergency Alarm is available only with MDC-1200 and STAR signaling formats. Emergency Alarm is programmed on the RADIO WIDE CONFIGURATION screen.

MOTOROLA Radio Service Software					Use UP / DOWN Arrows To Enable.				
MaxTrac 300 Model:									
CHANGE/VIEW:RADIO WIDE									
RADIO WIDE CONFIGURATION									
MODEL INFORMATION					OPTIONS (Cont.)				
BSINJASDMS_K	.....	.60	WATT		ZONE/MODE DISPLAY	.....	DISABLED		
LOW BAND	.....	42.0	- 50.0	MHz	PRIORITY 2 SCAN MODE	.....	OFF		
SQUELCH	.....			Coded	PRIORITY SAMPLING RATE	.....	SLOW		
CONVENTIONAL MODES	.....	.32			SCAN TALK BACK	.....	.N		
SERIAL NUMBER	.....	BOUGSALUAM			EMERGENCY ALARM	.....	NONE		
OPTIONS					ACC. INTERNAL				
TIME OUT TIMER	.....	.060			ACC. EXTERNAL	.....	PUBLIC ADDRESS		
HANDSET	.....	.N			ACC. CUSTOM	.....	.N		
OFF HOOK FL/SPL	.....	.N							
F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
HELP	MORE			PRINT				OTHER	EXIT
	RAD WIDE			SCREEN				ACCESSRY	

At this screen, move the cursor to the Emergency Alarm data field. Use the up/down arrow keys to select NONE, Standard, or Silent Emergency operation. When the Emergency Alarm is activated, the Emergency Mode data field will be displayed. Move the cursor to this data field and enter the number of the mode on which the Emergency Alarm will be transmitted.

In order for the RSS to accept the mode number, it must have a valid signaling system assigned to it. Enter 00 if the Emergency Alarm is to be transmitted on the Mode selected by the operator of the radio. It is recommended that the Emergency Mode be used so that all Emergency Alarms in the system will be directed to the same mode. If no emergency mode is selected, all modes must be programmed to transmit an Emergency Alarm.

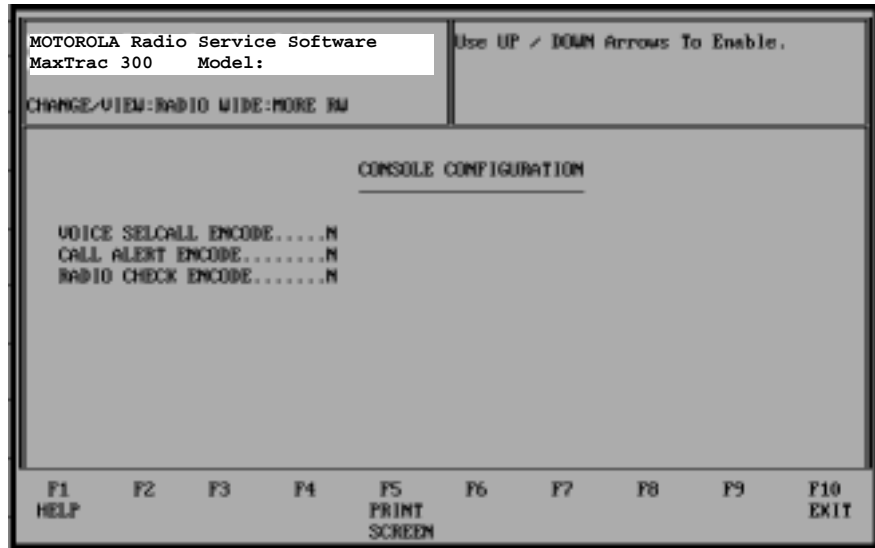
Note: The emergency switch must be installed when the radio is programmed. If it is not, the radio will immediately enter the Emergency Alarm sequence by keying the transmitter as soon as it is programmed.

Programming Encoder Features



The MaxTrac radio may be set up as an encoding unit using function keys at the CONSOLE CONFIGURATION screen. To display the CONSOLE CONFIGURATION screen, press F2 on the RADIO WIDE CONFIGURATION screen.

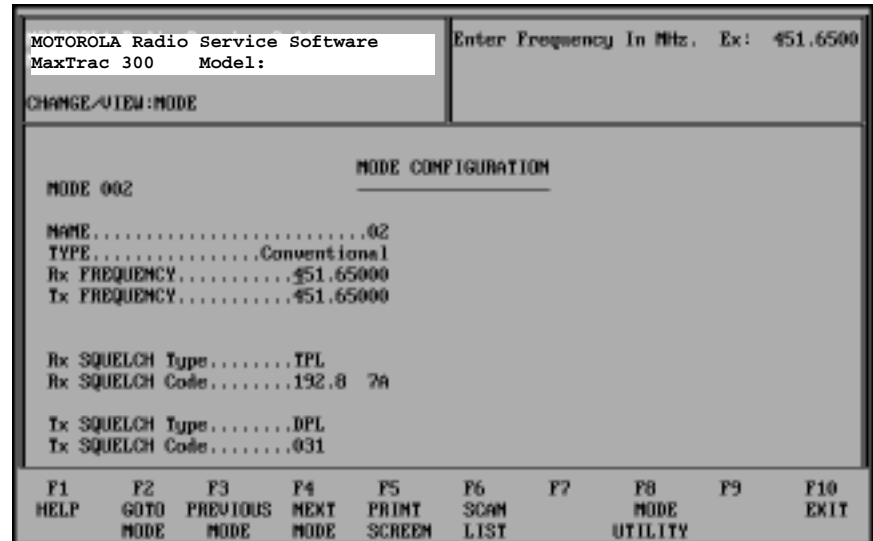
Three encoder functions are available on this screen. Voice Selective Call and Call Alert encode are available with MDC-1200, Quik-Call II and DTMF. The third function is Radio Check which is only available with MDC-1200. Encoder features use the Call List to generate IDs for the units to be called. To change an encoder feature, move the cursor to the data field of the desired feature and use the up/down arrow keys to enable ("Y") or disable ("N") the feature.



Programming a Signaling System



Once a signaling system is defined, it must be assigned to a mode if it is to be used in the radio. Signaling Systems are assigned on the MODE CONFIGURATION screen.



Each mode may have one signaling system assigned to the receiver, one signaling system assigned to the transmitter, or both. The receive and transmit signaling systems need not be the same. For example, a radio may be set up to receive Quik-Call II and transmit a DTMF PTT-ID.

At the MODE CONFIGURATION screen, select the mode number that you want to assign a signaling system to. Now, move the cursor to the RX Signaling System data field. 00 is used to show that no signaling system will be used on this receiver mode. Use the up/down arrow keys to select the desired signaling system number. Note that the signaling format will be displayed under the data field. Next, move the cursor to the TX Signaling System data field and assign a signaling system to the transmitter or 00 for no signaling.

Repeat the above procedure for every mode that will have a signaling system. Here is an example of a two-mode radio set up with signaling. Three Signaling Systems have been defined on the SIGNALING CONFIGURATION screen. System 01 is an MDC-1200 system, System 02 is a Quik-Call II system, and System 03 is a MDC-1200 system which is not the same as System 01.

The customer wants Mode 1 to receive Quik-Call II and transmit MDC-1200 IDs. On Mode 2, the customer wants a full MDC system with Emergency Alarms steered to Mode 2. Using the MODE CONFIGURATION screen selected for Mode 1, set the Signaling System data field to 02 and the TX Signaling System data field to 01. Press the NEXT MODE function key to display Mode 2. Set the RX Signaling System data field to 03 and the TX Signaling System data field to 03. The three signaling systems are now assigned to the two modes. To configure Emergency Alarm, select the RADIO WIDE CONFIGURATION screen. Set the Emergency Alarm data field to STANDARD and the Emergency Steering Mode data field to 02. The signaling programming is complete and the radio's codeplug may now be programmed.

Defining Call Lists for Call Alert, Selective Call, and Radio Check



A radio that is used as an encoder must have a call list. A call list is used by the encoding radio to encode the proper ID and signaling format for the radio to be called. A call list is built in the CALL LIST CONFIGURATION screen. This screen can be accessed from the CHANGE/VIEW screen by pressing **F9**. The parameters to build a call list are discussed below.

MOTOROLA Radio Service Software MaxTrac 300 Model:		Enter Value.
CHANGE/VIEW:CALL LIST		
CALL LIST CONFIGURATION		
ENTRY NUMBER.....	.01	
DISPLAY NAME.....	.01	
SIGNALLING SYSTEM.....	.02	MDC-1200
REVERT MODE.....	.NONE	
ACKNOWLEDGE EXPECTED.....	.N	
STRIP FL.....	.N	
ID TYPE.....	.INDIVIDUAL	
ID.....	.1111	
F1	F2	F3
HELP	PREVIOUS	NEXT
	ENTRY	ENTRY
F5	F6	F7
PRINT	VIEW	DELETE
SCREEN	LIST	ENTRY
F8	F9	F10
ADD	ENTRY	EXIT

Note: A signaling system must be set up for each type of signal format used in the call list. In addition, the radio must be set up as an encoder unit on the CONSOLE CONFIGURATION screen. For more information, refer to the sections pertaining to signaling and console configuration earlier in this manual.

F3 & F4 – Previous and Next Entry

Pressing **F4** will advance the screen to the next entry number. If you are at the last entry in the call list, press **F4** to move to the first entry. **F3** will return you to the previous entry. If you are at the first entry, **F3** will take you to the last entry in the list.

F5 – Print Screen

Sends the currently displayed Call List Entry to the printer.

F6 – View List

Displays the Call Lists defined until that time.

F7 – Delete Entry

Deletes the currently displayed entry from the call list. Entries that followed the deleted entry will be automatically moved up the list.

F8 – Add Entry

The Call List consists of 1 to 99 entries. Each entry is identified by an entry number which may range from 1 to 99. The radio will scroll through this list starting at 1 and progressing toward the highest entry in the Call List. An empty Call List will have zero entries. To add a new entry, press **F8**.

Display Name	The Display Name is the number used by the radio's two-digit display to identify the call entry. This name is by default the same as the entry number. But the number may be edited to make grouping of individual and group calls more organized. For instance, a system with 10 radios may display each radio from 01 to 10. Group calls which start at entry number 11 could be displayed as 50, 51, etc. This would clearly distinguish an individual call from a group call. The displayed name may be entered directly or by using the up/down arrow keys.
Signaling System	The radio needs to know what type of system the called radio will be using. In the Signaling System data field, enter the system number of the desired signaling system. This can be done by entering the number directly or by using the up/down arrow keys.
Revert Mode	The Call List is not slaved to any mode in the radio. If the called radio is known to be on a particular mode (channel), that mode may be entered in the Revert Mode data field. When the call is made, the radio will transmit the call on the revert mode and stay on that mode. Entering 00 will direct the radio to transmit on the current mode. This is also the default. Enter the mode number directly or use the up/down arrow keys to select an entry.
Acknowledge Expected	MDC-1200 has the ability to acknowledge calls. If an MDC-1200 system is selected, the Acknowledge Expected data field will appear. If set to yes ("Y"), the radio will wait for an acknowledge and retry up to four times if no acknowledge is received. If set to no ("N"), the radio will ignore acknowledges and will not perform any retries. The default is "Y". Use the up/down arrow keys to set this data field to "Y" or "N".
Strip PL	Some systems require that PL be stripped during a call transmission. If this is required by your system, set this data field to yes ("Y"). Use the up/down arrow keys to select an entry.
ID Type & ID Number	The radio needs to know what type of call is to be made: individual call, group call or fleet call. The type available for each format can be found in the table below. Select the type using the up/down arrow keys. After the desired ID type has been selected, the appropriate data field for the ID number will appear. Use the table below as a guide to entering the correct ID numbers. When you have completed building the Call List, press F10 to return to the CHANGE/VIEW MENU.

Call List Parameters

Data Choice	ID Range	Description
MDC-1200		
INDIVIDUAL GROUP	0001-DEEE 000-EEE	Enter the individual ID. It contains four hexadecimal digits. A Group ID has three hexadecimal digits. Typically the first digit is the FLEET digit. The second and third are the group. The digit "F" is the wildcard digit.
FLEET ALL	0-E NONE	A Fleet ID is one hexadecimal digit in length. The digit 'F' is the wildcard digit. ALL is used to call all radios in the system.
QUIK-CALL II		
TWO TONE LONG TONE	67 - 3062 Hz 67 - 3062 Hz	Enter the two tones for the ID. Enter a single tone for the Group ID.
DTMF		
INDIVIDUAL/ GROUP	0 to 9, *, #	Enter the individual ID. It may contain 1 to 8 digits. Group ID's may not exceed the number of ID digits and cannot exceed the maximum number of digits in the system ID.

Programming the Expanded Accessory Connector

The Expanded Accessory Connector has six programmable VO pins to allow it to adapt to various accessories. For ease of programming, commonly used accessories have their pin functions predefined and can be programmed on one data field. Some accessories will need to be programmed on a pin-by-pin basis. The RSS provides screens for customizing your application pin by pin.

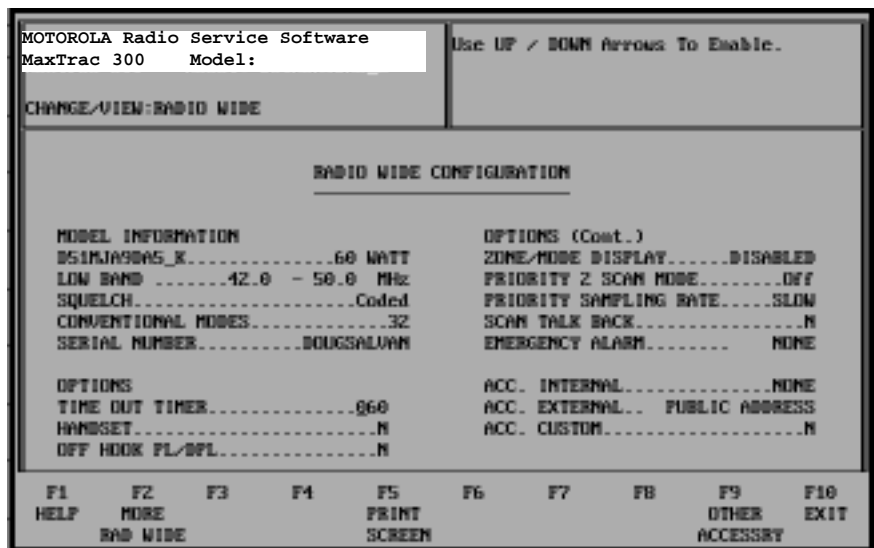
Internal Accessories

Internal Accessories are accessories that are physically placed inside the radio and that do not actually use the connector. Connections are made internal to the radio but the pin functions are still used. At this time, there is only one Internal Accessory. This is the DTMF decoder board. If the Internal Accessory field is set to DTMF, the decoder should be installed in the radio before you begin programming.

Programming Internal Accessories



Internal Accessories are programmed in the RADIO WIDE CONFIGURATION screen. To program the Internal Accessory, move the cursor to the Accessory Internal data field. Once in this field, use the up/down arrow keys to select either DTMF or NONE.



External Accessories

External Accessories interface with the radio through the Expanded Accessory Connector. The RSS has predetermined pin functions for accessories. These are Public Address, Remote, and General I/O.

Programming External Accessories

External Accessories are programmed in the RADIO WIDE CONFIGURATION screen. To program the External Accessory, move the cursor to the Accessory External data field. Once in this field, use the up/down arrow keys to select the desired accessory.

Viewing Accessory Connector Pin Functions



Press **F9** on the RADIO WIDE CONFIGURATION screen to display the ACCESSORY CONNECTOR CONFIGURATION screen.

MOTOROLA Radio Service Software		Use UP / DOWN Arrows To Enable.			
MaxTrac 300 Model:					
CHANGE-VIEW: RADIO WIDE: CONN CON					
ACCESSORY CONNECTOR CONFIGURATION					
INTERNAL ACCESSORY: NONE		EXTERNAL ACCESSORY:		PUBLIC ADDRESS	CUSTOM: NO
PIN NUMBER	FUNCTION # DESCRIPTION	DATA DIRECTION	DEBOUNCE	ACTIVE LEVEL	
4	03 External Alarm	OUTPUT	NO	HIGH	
6	00 NULL	INPUT	NO	LOW	
8	00 NULL	INPUT	NO	LOW	
9	02 Emergency Switch	INPUT	YES	HIGH	
12	00 NULL	INPUT	NO	LOW	
14	04 PA Switch	INPUT	YES	LOW	
POWER-UP DELAY: 0.187 SEC					
F1	F2	F3	F4	F5	F6
HELP		PREVIOUS	NEXT	PRINT	
		ACC.EXT	ACC.EXT	SCREEN	
					F7
					F8
					F9
					RESET
					DEFAULT
					F10
					EXIT

The functions of the programmable pins are displayed for the selected accessory. The tables in the following section of this chapter define each available pin function in the radio. This table be used as an aid to help install the accessory in the radio. Press **F5** to get a print-out of the pin functions. If you wish to modify pin definitions, refer to the section on customizing the Accessory Connector.

Customizing the Expanded Accessory Connector



The Expanded Accessory Connector's pin functions may be modified on the ACCESSORY CONNECTOR CONFIGURATION screen. Press **F9** at the RADIO WIDE CONFIGURATION screen to display this screen.

MOTOROLA Radio Service Software MaxTrac 300 Model:		Use UP / DOWN Arrows To Enable.							
CHANGE/VIEW: RADIO WIDE: COMM CON									
ACCESSORY CONNECTOR CONFIGURATION									
INTERNAL ACCESSORY: NONE		EXTERNAL ACCESSORY:		PUBLIC ADDRESS CUSTOM: NO					
PIN NUMBER	FUNCTION # DESCRIPTION	DATA DIRECTION	DEBOUNCE	ACTIVE LEVEL					
4	03 External Alarm	OUTPUT	NO	HIGH					
6	00 NULL	INPUT	NO	LOW					
8	00 NULL	INPUT	NO	LOW					
9	02 Emergency Switch	INPUT	YES	HIGH					
12	00 NULL	INPUT	NO	LOW					
14	04 PA Switch	INPUT	YES	LOW					
POWER-UP DELAY: 0.187 SEC									
F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
HELP		PREVIOUS ACC. EXT	NEXT ACC. EXT	PRINT SCREEN				RESET DEFAULT	EXIT

Customizing the expanded accessory connector becomes necessary when more than one accessory requires programmable functions or a non-standard accessory. The display also contains useful information on the characteristics of each function. Functions available on this screen are Data Direction, Debounce and Active Level.

Data Direction indicates whether the information is flowing to or from the radio. Output implies that the data comes from the radio, and Input implies that the data comes from the accessory.



Caution

Mismatching the data direction with the accessory may result in damage to the radio or accessory or both. Therefore, use caution when selecting functions for non-standard accessories.

Note: Data direction is determined by the selected function and is not programmable.

Debounce determines whether the radio waits a short period of time before acting. This is done to make sure that any mechanical switch bounce is accounted for. This parameter is programmable.

Active Level determines whether a high voltage or low voltage means to "do something". This parameter is programmable.

Programming Connector Pin Functions

Each programmable pin on the Expanded Accessory Connector has a limited number of functions that can be assigned to it. There are two type of functions: independent and dependent. Dependent functions cannot be reprogrammed. They depend on the assigned pin when used with the selected Accessory. Independent functions can be reprogrammed.

The tables below list accessory connector input and output functions. Both tables give the type of function and a short description. For defaults on each function, refer to the MaxTrac System Planner. Each function has a function number assigned to it. This number is used to assign a function to a pin. The tables below can be used to determine which functions are necessary for your application. Using the tables and the ACCESSORY CONNECTOR CONFIGURATION screen, you should be able to configure the accessory connector to suit your application.

Accessory Connector Pin Input Functions

Function #	Function Type: Trunked	Function Type: Conventional	Function Description
00	Independent	Independent	NULL – Pin has no function.
02	Dependent	Independent	Emergency Switch – Input for emergency switch.
04	Independent	Dependent	PA Switch – Inhibits PTT for Public Address.
06	Dependent	Independent	TX PL Inhibit – When active, the radio strips PL from any transmissions.
08	Dependent	Independent	TOC Disable – When active, disables PL/DPL turn off code at the end of a transmission.
10	Independent	Dependent	I/O Mic Off Hook – Sends an indication to the radio when a remote microphone is Off Hook.
12	Dependent	Dependent	Page PTT – PTT of Modem Pager.
14	Dependent	Independent	TX Audio Mute – When active, inhibits microphone audio from being transmitted.
16	Dependent	Dependent	Data Ready – Input for DTMF decoder board.
18	Dependent	Dependent	DTMF Data – Input for DTMF decoder board.
20	Dependent	Dependent	SSM PTT – PTT of Smart Status/Message.
22	Dependent	Independent	SSM DOS – When active, inhibits all speaker audio.
24	Dependent	Independent	SSM HOOK – When active, allows external sidetone through speaker. If carrier is present, voice will also be heard.
26	Dependent	Dependent	SIDETONE IN – Input for sidetone produced by Smart Status/Message.
32	Dependent	Dependent	REQ TO SEND – Is active whenever the AVL unit wishes to initiate or maintain a transmission. Also used by Channel 1 Revert in parallel with GO TO CHANNEL.
34	Independent	Independent	RX AUDIO MUTE – When active, either mutes the received audio or signals an AVL Emergency Condition.
36	Dependent	Dependent	GO TO CHANNEL – Used by AVL unit to redirect the mobile radio to a predetermined channel. Also used by Channel 1 Revert in Parallel with REQ TO SEND.

Accessory Connector Pin Output Functions

Function #	Function Type: Trunked	Function Type: Conventional	Function Description
01	Independent	Independent	NULL - Pin has no function.
03	Independent	Independent	External Alarm - Driver pin for external relay to activate Horn and Lights when a Call Alert is received.
05	Dependent	Independent	PL/ DPL and CSQ Detect - Pin is active when PL/DPL and a Carrier are detected by the radio.
07	Dependent	Independent	CSQ Detect - Pin is active when Carrier is detected by the radio.
09	Dependent	Dependent	Data Clock Out - Output for DTMF decoder board.
11	Dependent	Dependent	Phone Patch Inhibit - Output to inhibit Phone Patch operation.
17	Dependent	Dependent	CLEAR TO SEND - When active, signals that the mobile radio has been keyed and is prepared to send AVL data.

On the ACCESSORY CONNECTOR CONFIGURATION screen, move the cursor down the function number column to the desired pin. Use the up/down arrow keys to select the desired function. Notice that description data direction, debounce and active level change according to the function. The NULL function is used to de-activate a programmable pin. There are also four active function keys which are described below.

F3 & F4 – Previous and Next Accessory

Pressing **F4** will advance the screen to the next accessory. If you are at the last accessory, **F4** will take you to the first accessory. Pressing **F3** will return you to the previous accessory. If you are at the first accessory, **F3** will take you to the last accessory.

F5 – Print Screen

Sends the currently displayed accessory screen to the printer.

F9 – Reset Default

Resets all the pins to their default functions. This will make the pin assignment non-custom. The Custom data field will revert to “NO”. Debounce and Active level will also return to their default levels.

Possible Pin Assignments for Independent Functions

Pin	Conventional	Trunked
4	External Alarm NULL PL/DPL and CSQ Detect CSQ Detect	External Alarm NULL
4	NULL Emergency Switch TX PL Inhibit TOC Disable TX Audio Mute SSM Hook SSM DOS RX Audio Mute	NULL PA Switch I/O Mic Off Hook RX Audio Hook
8	NULL PL/DPL and CSQ Detect CSQ Detect Emergency Switch TX PL Inhibit TOC Disable TX Audio Mute SSM Hook SSM DOS RX Audio Mute	NULL PA Switch I/O Mic Off Hook RX Audio Mute
9	NULL Emergency Switch TX PL Inhibit TOC Disable TX Audio Mute SSM Hook SSM DOS RX Audio Mute	NULL PA Switch I/O Mic Off Hook RX Audio Mute
12	NULL PL/DPL and CSQ Detect CSQ Detect Emergency Switch TX PL Inhibit TOC Disable TX Audio Mute SSM Hook SSM DOS RX Audio Mute	NULL PA Switch I/O Mic Off Hook RX Audio Mute
14	NULL PL/DPL and CSQ Detect CSQ Detect Emergency Switch TX PL Inhibit TOC Disable TX Audio Mute SSM Hook SSM DOS RX Audio Mute	NULL PA Switch I/O Mic Off Hook RX Audio Mute

Programming Debounce

Debounce is active only on INPUTS. Debouncing is usually required for pins that are driven by relays or other mechanical devices. Functions that have Debounce as “NO” should not use relays or mechanical devices to drive them. To change Debounce, move the cursor to the Debounce data field for the pin that needs to be changed. Use the up/down arrow keys to change from debounce on (“Y”) to debounce off (“N”) or vice versa.

Programming the Active Levels

The programmable pins are binary. They become active on either a high voltage or a low voltage. Some non-standard accessories may not have the same active level as the default active level. However, the RSS allows the active levels to be changed. To change an active level, move the cursor to the Active Level data field for the pin that needs to be changed. Use the up/down arrow keys to change the active level from high to low or vice versa.

Programming the Power-Up Delay

The radio ignores the active levels on the programmable pins during power up. This is done to give the accessory device time to initialize itself. The time that the radio delays is the Power-Up Delay. The default time for this delay is 0.2 seconds. If this delay need to be changed, move the cursor to the Power-Up Delay data field. Use the up/down arrow keys enter the new value. The delay value may range from 0.0 to 4.3 seconds.

Press **F10** to return to the RADIO WIDE CONFIGURATION screen.