7K Upgrade V2.02

Thank you for purchasing the most extensive *7K* upgrade yet!

Enclosed you will find:

- A replacement EPROM containing the new *7K* firmware.
- Update pages for the *7K Owner's Manual*, Version 1.16 (February 94).

If you are upgrading from a version before V2.0, you will also find:

- A replacement RAM that also contains a battery and clock/calendar.
- Instructions for the modification required to install this new RAM.

How To Proceed

If you have more than one copy of the manual, now is a good time to make a copy of the update pages. Or, call *S-COM* and order another copy of the update pages.

It is recommended that you study the update pages to become familiar with the new features. Then, update your manual following the *Manual Update Instructions.*

Turn the power off on the *7K* and replace the EPROM. Also replace the RAM, if required. Follow the instructions on page 2-1 of the manual to *Cold Reset* the controller.

Now, program the controller the same way you did for the previous version. Even with the large number of new features, the programming commands that you used before will work fine. When you complete the upgrade, you will notice the following differences in the way the *7K* behaves:

- When you dump the patch from *Phone Line Control Mode*, the *Autopatch Dump Macro* will not be executed. If your *Autopatch Dump Macro* contained a message, you won't hear it like you used to.
- If your *Autopatch Dump Macro* contains a command to set the *Autopatch Call Type,* you may have noticed that, in previous versions, the *Redial Last Number* command didn't work. The *Select Autopatch Call Types* command was clearing the redial buffer so that the *Redial Last Number* never worked. In the upgrade, the *Call Type* command only clears the redial buffer if the new call type is different. So, the *Redial Last Number* command now works.
- If you have enabled the path from Receiver 2 or Receiver 3 to Transmitter 1, you will notice a new courtesy message -- there are now separate courtesy messages for each receiver.

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Taking Advantage of the New Features

Now you can add some new programming to take advantage of the new features:

- If you enable the paths from Receiver 2 or Receiver 3, you can program new courtesy messages for these receivers. (See page 18-9.)
- If you use the autopatch, you can add new Autopatch Busy, Error, and Off Messages for speech feedback even with the Command Responses turned off. (See page 7-51.)
- If you read the Call Count, you can now read the call count in speech using the new Message Run-Time Variable. (See page A-45.)
- If you use Receiver 2 or Receiver 3, you can now wire both the COR and CTCSS inputs and program a Path Access Mode. (See page 13-5.)
- If you have a CTCSS encoder on your repeater transmitter, you can now have the CTCSS tone go away before the transmitter so that your users don't hear a squelch tail. (See pages 10-2 and 17-13.)
- If you have a fan blowing on your transmitter, you can control it so that it only runs when required. (See page 20-7.)
- If you have macros containing Command Pauses that you use to delay a command until after a message is sent, you can use the new "9999 xxxx" Message Control Character to automatically execute a macro after a message is sent. This guarantees synchronization of the message with the macro that follows it without any uncertainty. Since Pauses hold up other macros that are playing, things will operate more smoothly on the controller. (See page 4-43.)

Of course, there is lots more in the update, but these will get you started!

Getting Help

If you have problems with the update or questions about new features, you can contact *S-COM* any of the following ways:

Telephone: 970-663-6000
Fax: 970-669-1585
E-mail: scomind@aol.com

or, ask your question on the *S-COM* e-mail discussion list!

We are here to help!

73,

Bob Schmid, WA9FBO
Dave Maciorowski, WA1JHK

7K Upgrade V2.02

Updating your manual --

Perform the following steps to update your manual:

Mark page 4-3: “See page A-46.”

Mark page 4-35: “See pages 7-51, 12-9, and 18-9.”

Mark page 4-38: “See pages 7-51, 12-9, and 18-9.”

Remove and discard pages 4-41 and 4-42.

Add new pages 4-41 through 4-44 to the end of Chapter 4.

Add new pages 5-5 and 5-6 to the end of Chapter 5.

Mark page 6-9: “See page 6-17.”

Add new pages 6-17 and 6-18 to the end of Chapter 6.

Mark pages 7-24 and 7-25: “See page 7-60.”

Mark page 7-28: “Up to 40 entries are permitted.”

Mark page 7-30: “Up to 40 entries are permitted.”

Mark page 7-37: “See page A-45.”

Add new pages 7-51 through 7-64 to the end of Chapter 7.

Remove and discard pages 8-1 through 8-4.

Add new pages 8-1 through 8-8.

Mark page 9-2: “See page 9-7.”

Mark page 9-3: “See page A-47.”

Add new pages 9-7 and 9-8 to the end of Chapter 9.

Replace pages 10-1 and 10-2 with new pages 10-1 and 10-2.

Mark page 11-5: “See page 11-13.”

Add new pages 11-13 and 11-14 to the end of Chapter 11.

Replace pages 12-1 and 12-2 with new pages 12-1 and 12-2.

Mark page 12-3: “See page 12-9.”

Mark page 12-8: “See page 12-11.”

Add new pages 12-9 and 12-14 to the end of Chapter 12.

Mark page 13-2: “See page 13-5.” Cross out the note.

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Add new pages 13-5 and 13-6 to the end of Chapter 13.

Mark page 17-11: “See page 17-16.”

Add new pages 17-13 and 17-16 to the end of Chapter 17.

Mark page 18-2: “See page 13-5.”

Add new pages 18-9 and 18-12 to the end of Chapter 18.

Add new pages 20-1 through 20-8 after Chapter 19.

Remove and discard the V2.01 Remote Base update, if present.

Add new pages 21-1 through 21-32 after Chapter 20.

Mark page A-18: “See page A-45.”

Mark page A-19: “See page A-47.”

Replace pages A-25 through A-38 with new pages A-25 through A-56.

Add the page you are reading just before Chapter 1.

Your manual has been updated.

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Run-Time Variables

Run-Time Variables (RTV) are 4-digit codes that you place into a message to be expanded at “run time”. Run time is the instant the message is actually transmitted by the controller. The message handler recognizes run-time variables because they always begin with 98.

When the message handler encounters an RTV, it forms the appropriate message and transmits it in place of the RTV code. The RTV can expand into many characters of speech. But, RTVs only count as 4 digits against your message storage limit of 50 2-digit codes. You could, for example, announce the time or date as part of an ID, autopatch termination, or other occasion. You may precede and/or follow the RTV with other messages, routing codes, and so on. RTVs may be placed in succession to form a single expression.

Message Run-Time Variables

Run-Time Variable	Meaning	Example
9810	hour & minute, 12-hr format CW	2 45 in CW
9811	AM/PM, CW	PM in CW
9812	hour & minute, 24-hr format, CW	14 45 in CW
9813	day-of-week, CW	WED in CW
9814	month, CW	1 in CW
9815	day-of-month, CW	1 in CW
9816	seconds, CW	27 in CW
9820	hour & minute, 12-hr format, male voice	two forty-five (male)
9821	AM/PM, male voice	PM (male)
9822	hour & minute, 12-hr format, female voice	two forty-five (female)
9823	AM/PM, female voice	PM (female)
9824	hour & minute, 24-hr format, male voice	14 hours, 45 minutes (male)
9825	same as 9824 without “hours” & “minutes”	fourteen forty-five (male)
9826	day-of-week, male voice	Wednesday (male)
9827	cardinal day-of-month, male voice	one (male)
9828	ordinal day-of-month, male voice	first (male)
9829	month, male voice	January (male)
9830	“good morning/good afternoon/good evening”, female voice	good afternoon (female)
9831	“morning/afternoon/evening”, male voice	afternoon (male)
9832	seconds, male voice	twenty-seven (male)
9896	Call Count, CW	105
9897	Call Count, male voice	one zero five (male)
9898	Software Version, CW	202
9899	Software Version, male voice	two point zero two (male)

A feature of the clock and calendar RTVs is that the current time and date are stored at the first RTV encountered in a message. If the time or date "rolls over" during the message transmission, it will not affect the time or date being sent.

RTV Notes

- 9820 and 9822, which are spoken 12-hour time RTVs, will say "o'clock" on the hour (xx:00). Midnight to 11:59 is AM. Note: these RTVs only speak the hour and minute. Use 9821 and 9823 to speak AM or PM.
- 9827 is used with the month outside the U.S., as in "One January." 9828 is used with the month inside the U.S., as in "January First."
- 9830 and 9831 switch from "afternoon" to "evening" at 6:00 PM.
- The real-time clock and calendar features leap-year correction including proper operation in the year 2000.
- 9816 and 9832, seconds in CW or speech, can be used to accurately set the clock. (See *Chapter 8, Clock and Calendar*.)

Note: The voiced run-time variables require that your controller be fitted with a speech synthesizer module.

Here are some ideas: To send the time and AM or PM in voice, enter:

```
(PW) 15 9820 9821 *
```

You would hear "two forty-five PM" or something similar.

To say "the time is ()", enter:

```
(PW) 15 9960 0000 0500 0514 0253 9820 9821 *
```

9960 is the control character for synthesized speech. 0000 is a request to pause if the transmitter is not already on the air. You may also need an audio routing command (see page 4-3).

To say the software version, enter:

```
(PW) 15 9899 *
```

You can create similar commands to send "today is ()", "the date is ()", and so on. Dumping the autopatch could announce "call complete at ()." The ID could include "it is (Monday) (morning) on the W0XYZ repeater."

Note: It is not necessary to place the control code 9900 in front of CW run-time variables or the control code 9960 in front of voiced run-time variables. The RTV automatically inserts these control codes into the message. However, you must enter control codes *after* the RTV if you have a different type of message following.

Synchronizing Messages and Commands

In the controller, the Message Handler processes messages from the Message Queue. The Command Executive processes commands and macros from the Execution Queue. These queues are processed independently but simultaneously. Messages and commands queued at the same time and expected to operate in sequence can have unexpected results. That is, unless you use the message control character to keep everything in synchronization.

Suppose you want to generate a DTMF page of “1234”, then switch on logic output number 1. You might write a macro with the following commands:

```
(PW) 20 9000 (PW) 15 9950 01 02 03 04 *
(PW) 29 9000 (PW) 70 1 *
```

However, this command sequence will not have the expected results. The first command queues the DTMF page to the message queue for execution then immediately executes the command to turn on the logic output. The logic output will change before the DTMF command has completed.

To cause the second line of the macro to wait until after the first line has sent the DTMF page, you write this as two macros:

```
(PW) 20 9000 (PW) 15 9950 01 02 03 04 9999 9001 *
(PW) 20 9001 (PW) 70 1 *
```

“9999” in the macro 9000 is a *Message Control Character* that causes a macro to be executed when the Message Handler reaches that point in the message. The “9001” that follows the 9999 message control character is the name of the macro to execute. This sequence operates as expected because the DTMF page will complete before the command to turn on the logic output is executed.

This type of sequencing also has uses in *Autopatch* speed dial macros that dial a pager, then send a DTMF page as the message to be displayed on the dialed digital pager.

Assign Control Operator Privilege Level to a Range of Commands

Changes the Control Operator Privilege on a range of commands.

- Enter the first and last root number of the command for which a privilege level change is desired, then enter a 0 or 1 for the privilege level.
- 0 = control command may be used by *either* the master or the control operator password.
- 1 = control command may be used *only* by the master password.

Command Form:

Command	Form	Data Digit
Assign Control Operator Privilege Level to a Range of Commands	(PW) 94 (first root number) (last root number) x*	0 = used by either password 1 = used by only master password

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: All commands may be used by either password.

Example:

Assume that you want to reset all privilege level entries for use by both passwords, enter the following:

```
(PW) 94 00 99 0 *
```

Assume that you want to prevent control operators from changing passwords or a privilege level enter the following:

```
(PW) 94 92 94 1 *
```

Note: If you want to prevent a control operator from accessing a single root code use the *Assign Control Operator Privilege Level command (see page 5-4.)*

List Macro

Examines the contents of a macro and sends it in either CW or speech.

- Entering this command causes the controller to send all stored digits in CW or speech. In CW the (*) character is sent as a fraction bar (/); in speech, the (*) character is sent as the word “enter”.
- The macro name must be entered using 4 digits.
- If the macro you wish to list has a shorter name, enter leading zeros.

Command Form:

Command	Form
List Macro in CW	(PW) 33 (macro name) *
List Macro in Speech	(PW) 35 (macro name) *

Acknowledgment: Sends the contents of the macro in CW or speech.

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? not found	macro name does not exist in the directory

Default Condition: None.

Example:

Assume that a macro exists with the name 6A. It contains two commands as discussed in the *Create New Macro* and *Append To Macro* commands (see pages 6-5 and 6-7). To make the example clearer, assume that the password is 99.

When the commands were originally placed into the macro, they looked like this:

`(PW) 70 1 *` and `10 663 6000 *`

To examine this macro in CW, we would enter:

`(PW) 33 006A *`

The controller would then send:

`9 9 7 0 1 / 1 0 6 6 3 6 0 0 0 /`

To examine this macro in speech, we would enter:

```
(PW) 35 006A *
```

The controller would then speak:

> “Nine nine seven zero one enter one zero six six three six zero zero zero enter”

Select (Review) Autopatch Error Messages

One of these messages is sent over the repeater transmitter when a telephone number cannot be dialed.

- The Off Message is sent when the Autopatch is off.
- The Busy Message is sent when the Busy Logic Input is active.
- The Reject Message is sent when the phone number entered by the user or programmed in a macro matches an entry in the Reject Table.
- The Error Message is sent when a phone number entered by the user or programmed in a macro does not match one of the enabled Call Types or Accept Table entries.
- The No-Redial-Number Message is sent when a redial command has been entered and there is no phone number in the redial buffer.
- If an autopatch message is not programmed, the default CW message will be sent only when Command Responses are enabled.

Command Form:

Command	Form	Default
Select Autopatch Off Message	(PW) 31 44 (message) *	OFF in CW
Select Autopatch Busy Message	(PW) 31 42 (message) *	BZ in CW
Select Autopatch Reject Message	(PW) 31 46 (message) *	?REJ in CW
Select Autopatch Error Message	(PW) 31 45 (message) *	?ERR in CW
Select Autopatch No-Redial-Number Message	(PW) 31 47 (message) *	CLR in CW
Review Autopatch Off Message	(PW) 34 44 *	none
Review Autopatch Busy Message	(PW) 34 42 *	none
Review Autopatch Reject Message	(PW) 34 46 *	none
Review Autopatch Error Message	(PW) 34 45 *	none
Review Autopatch No-Redial-Number Message	(PW) 34 47 *	none

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: The default CW message is sent only if Command Responses are enabled.

Select (Review) Autopatch Dump Message

This message is sent over the repeater transmitter when an autopatch or reverse patch is terminated.

- Lets the user know that an autopatch or reverse patch was successfully terminated.
- This message is not sent when *Phone Line Control Mode* call is terminated.

Command Form:

Command	Form	Default
Select Autopatch Dump Message	(PW) 31 43 (message) *	none
Review Autopatch Dump Message	(PW) 34 43 *	none

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: No message.

Example:

To program the dump message to say “Call complete at (time) on (day) (date)”, e.g. “Call complete at 12:23 PM on Monday July 21st”, enter the following:

```
(PW) 31 43 9960 0067 0088 0039 9820
           9821 0358 9826 9829 9828 *
```

Select Pause (“B”) Digit Time

Programs the amount the Pause Digit in a phone number delays.

- When the user dials a telephone number or a macro is programmed to dial a telephone number, a pause digit (the DTMF character “B”) provides a programmable delay (see page 7-3 for use).
- Enter 1, 2, or 3 digits representing the desired time of the pause in tenths of seconds.
- The range of the time is 0.1 second to 10.0 seconds.

Command Form:

Command	Form	Data Digit
Select Pause (“B”) Digit Time	(PW) 49 96 xxx *	(001-100 in mmt – minutes and tenths) = (00.1-10.0) seconds

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: 5 seconds.

Example:

To set the pause digit to 2 seconds, enter the following:

```
(PW) 49 96 20 *
```

Note: See Page 7-3, for instructions on using the pause digit when dialing.

Landline Hookflash

Causes a Hookflash to occur on the phone line.

- A hookflash (also called a flash) is an indication to a phone system to perform an action, for example to pick up another call that is waiting or to conference another party during an outgoing call.
- Enter this command to cause a hookflash.
- This command has no effect when no autopatch or reverse patch has been made.

Command Form:

Command	Form
Landline Hookflash	(PW) 83 1 *

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: None

Example:

Cause a hookflash on the phone line during an autopatch:

```
(PW) 83 1 *
```

Note: This command will have either no effect or will disconnect your call if your phone line is not equipped to respond to a hookflash.

Go Off-Hook

Causes the phone line to go off-hook.

- Enter this command to cause the phone line to go off-hook without dialing a phone number. This is like picking up a phone and getting dial tone.
- A second version of the command ignores the *Busy Logic Input*. This is like picking up an extension telephone while the telephone line is already in use.
- This command has no effect if an autopatch or reverse patch is in progress.

Command Form:

Command	Form
Go Off-Hook	(PW) 83 2 *
Go Off-Hook, Ignore Busy Logic Input	(PW) 83 3 *

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: None

Example:

To go off-hook on the patch, enter the following:

```
(PW) 83 2 *
```

To go off-hook on the patch even if the *Busy Logic Input* signals that the line is busy, enter the following:

```
(PW) 83 3 *
```

Select Dialing Prefix

Defines a dialing sequence that will precede any outgoing call.

- A dialing prefix is automatically dialed by the autopatch when an outgoing call is made.
- The prefix can contain up to 16 codes that represent DTMF/rotary digits, pauses, or commands to switch from DTMF to rotary dialing and back.
- The prefix is not dialed when the Go Off-Hook command is entered.
- Delete the dialing prefix by entering the command with no prefix codes.

Command Form:

Command	Form	Data Digits
Select Dialing Prefix	(PW) 83 10 (prefix) *	see table below
Delete Dialing Prefix	(PW) 83 10 *	none

Acknowledgment: Sends OK

Code	Function	Code	Function
00	DTMF or rotary digit 0	11	DTMF digit B
01	DTMF or rotary digit 1	12	DTMF digit C
02	DTMF or rotary digit 2	13	DTMF digit D
03	DTMF or rotary digit 3	14	DTMF digit *
04	DTMF or rotary digit 4	15	DTMF digit #
05	DTMF or rotary digit 5	16	1-second pause
06	DTMF or rotary digit 6	17	2-second pause
07	DTMF or rotary digit 7	18	5-second pause
08	DTMF or rotary digit 8	19	10-second pause
09	DTMF or rotary digit 9	20	dial the following digits in rotary mode
10	DTMF digit A	21	dial the following digits in DTMF mode

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: No dialing prefix is defined.

Example 1:

If you have your autopatch plugged into an extension on a PBX and need to dial 9 to get an outside line, enter the following:

```
(PW) 83 10 09 16 *       ; dial 9, 1-second pause
```

Example 2:

If you want outgoing calls from your autopatch to block your phone number from a Caller ID display unit, enter the following:

```
(PW) 83 10 14 06 07 16 * ; dial *67, 1-second pause
```

Example 3:

If you want to set up your autopatch to dial an outside line on a PBX by default, but still want to be able to dial other extensions on the PBX, you can set the default prefix in your *Autopatch Dump-Triggered Macro* (see page 7-10) by entering:

```
(PW) 83 10 09 16 *       ; dial 9, 1-second pause
```

This way your default *Dialing Prefix* is always reset after every call.

Then, create a macro that you dial before making a call to an extension on the PBX. Create a macro by entering:

```
(PW) 20 0001 (PW) 83 10 *  ; clear prefix
```

To make a call to an extension, enter:

```
1 * (APW) (extension number) *
```

For this example, assume your *Autopatch Password* is 10 and you are dialing an extension of 123, then you would enter:

```
1 * 10 123 *
```

When you dump the call, the *Autopatch Dump-Triggered Macro* will reset the *Dialing Prefix* to the default.

Enable/Disable ID Messages During Autopatch

Allows the Identifier to operate during an autopatch and reverse patch.

- Enter this command to allow the identifier to operate during an autopatch.
- Enter one digit, 0 for OFF (disabled), 1 for ON (enabled).
- By default, the identifier is disabled during an autopatch.
- This command has no effect if executed during an autopatch. This command will take effect on the next autopatch.

Command Form:

Command	Form	Data Digits
Enable/Disable ID During Autopatch	(PW) 63 09 x *	0 = OFF (disabled) 1 = ON (enabled)

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: Disabled.

Example:

To enable the identifier during a patch, enter the following:

```
(PW) 63 09 1 *
```

To disable the identifier during a patch, enter the following:

```
(PW) 63 09 0 *
```

Require Dump Before Next Call

Requires that a phone call in progress be dumped before another call can be made.

- Enter this command to prevent another call from being made before the current call is dumped by the user or timeout timer.
- By default, another call can be made while one is in progress. The current call will automatically be dumped.
- Enter one digit, 0 for OFF (disabled), 1 for ON (enabled).
- This inhibits a user from dumping the patch with any command except the patch dump command.

Command Form:

Command	Form	Data Digits
Require Dump Before Next Call	(PW) 63 10 x *	0 = OFF (disabled) 1 = ON (enabled)

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: Disabled, dump is not require before a new call.

Example:

To require that a current call is dumped before another call is made, enter the following:

```
(PW) 63 10 1 *
```

To allow another call to be made while a call is in progress, enter the following:

```
(PW) 63 10 0 *
```

Select Autopatch Call Types

Selects the types of calls permitted by the autopatch.

- Entering this command will dump any autopatch call in progress.
- If the call type being selected is different from the one currently selected, the autopatch redialer memory is cleared.
- Enter up to 8 digits from the *Autopatch Call Types Table* below.
- Entering no digits turns off the autopatch.
- Entering any digit from 0-8 will permit accepted numbers.

Command Form:

Command	Form	Data Digits
Select Autopatch Call Types	(PW) 60 x *	(0-8) Autopatch Call Types Table below

Data Digit	Autopatch Call Types	Explanation
none	no calls permitted	autopatch OFF (disabled)
0	accepted numbers only	accepted numbers only (see page 7-28)
1	0	operator
2	xxx-xxxx	7-digit local call
3	0-xxx-xxxx	7-digit operator-assisted/credit card call
4	1-xxx-xxxx	7-digit long distance call
5	0-xxx-xxx-xxxx	10-digit operator-assisted/credit card call
6	1-xxx-xxx-xxxx	10-digit long distance call
7	1-800-xxx-xxxx 1-888-xxx-xxxx	toll free call
8	xxx-xxx-xxxx	10-digit local call

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: Autopatch is OFF (disabled), no calls permitted.

Examples:

To turn the autopatch OFF (disabled), enter the following:

```
(PW) 60 *
```

To permit only accepted numbers, operator calls, and 7-digit local calls, enter the following:

```
(PW) 60 0 1 2 *
```

In the above example, the 0 would not have to be entered, since the 1 or 2 already permits accepted numbers. To permit all 9 types of calls, enter the following:

```
(PW) 60 0 1 2 3 4 5 6 7 8 9 *
```

Select Control Mode Dump-Triggered Macro

Assigns a macro to be executed upon dumping the patch in Phone Line Control Mode.

- Enter the 4-digit macro name using leading zeroes if the macro name is less than 4 digits.
- To delete the assignment, enter the command with no macro name.

Command Form:

Command	Form
Select Control Mode Dump-Triggered Macro	(PW) 26 81 (macro name) *

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: No macro assigned.

Note: The *Phone Line Control Mode Dump-Triggered Macro* will be executed if the patch "times out" while in *Phone Line Control Mode*.

Example:

This command makes the patch much more flexible. The dump macro can be used to change messages, logic outputs, or to send a message.

To assign macro 9001 to execute when the patch is dumped from *Phone Line Control Mode*, enter the following:

```
(PW) 26 81 9001 *
```

Select Reverse Patch Ring-Triggered Macro

Assigns a macro to be executed at the end of each ring on the phone line.

- This macro is repeated at each ring by the reverse patch program.
- Enter the 4-digit macro name using leading zeroes if the macro name is less than 4 digits.
- To delete the assignment, enter the command with no macro name.

Command Form:

Command	Form
Select Ring-Triggered Macro	(PW) 26 80 (macro name) *

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: No macro assigned.

Example:

To assign macro 9001 to execute at each ring, enter the following:

```
(PW) 26 80 9001 *
```

Chapter 8

Clock and Calendar

The Controller features a hardware real-time clock and calendar circuit with a lithium power source. Accurate time keeping is maintained during loss of main power.

To announce the time or date, you place special codes called *Message Run-Time Variables* into messages. See page 4-41 for more information.

The clock and calendar circuit is accurate to ±1 minute per month. For improved accuracy, commands are provided to manually or automatically adjust the clock to compensate for drift.

Set Clock and Calendar

Sets the clock and calendar.

- Enter all parameters shown below each time that you set the *Clock and Calendar.*
- All parameters consist of two digits except the day-of-week, which is one digit.
- The year parameter is needed for leap year correction.
- The clock and calendar is set when you release the (*) button.
- Seconds are automatically set to 00.

Command Form:

Command	Form	Data Digit
Set Clock and Calendar	(PW) 25 (year, month, day-of-month, day-of-week, hour, minute)*	from table below

Data Digit	Explanation
00-99	year
01-12 (January is 01)	month
01-31	day-of-month
0-6 (Sunday is 0)	day-of-week
00-23 (24-hour format)	hour
00-59	minute

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered

? err 2	illegal parameter:
	any lettered key;
	month = 00 or greater than 12;
	day-of-month = 0 or greater than 31;
	day-of-week greater than 6;
	hour greater than 23;
	minute greater than 59.

Default Condition: 00:00:00 on Wednesday, January 1, 1993.

Example:

Let’s set the clock to 6:02 PM on Saturday, March 21, 1992.

The year is 92, the month is 03, the day-of-month is 21, the day-of-week is 6, the hour is 18, and the minute is 02. The entire command is:

```
(PW) 25 92 03 21 6 18 02 *
```

Adjust Daylight Savings Time

Forces the clock to add, or subtract, 1-hour.

- This command simplifies the semiannual job of resetting the clock for customers affected by Daylight Savings Time. Instead of resetting the entire clock and calendar, use this command to add or subtract one hour.
- Don't use the "fall back" command between midnight and 00:59 AM. Otherwise, the hour will change to 23 (11:xx PM), but the day won't roll back. You will gain another day at midnight.
- Don't use the "spring ahead" command between 11:00 PM and midnight. Otherwise, the hour will change to 00, but the day won't roll forward. You will lose a day.
- If you are using the Scheduler to automatically "fall back", use the version of the "fall back" command with the inhibit. This prevents the scheduler from executing the command more than once.

Command Form:

Command	Form	Data Digit
Adjust Daylight Savings Time	(PW) 48 x *	0 = "fall back" (subtract 1 from hours) 1 = "spring ahead" (add 1 to hours) 2 = "fall back" prevented from being executed a second time for 61 minutes.

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: None

Example:

To manually set the clock 1-hour ahead, enter the command:

```
(PW) 48 1 *
```

To automatically set the clock 1-hour ahead on March 30, 1997, at 2 AM using the *Scheduler*, create a macro (9000 for this example) and a *Scheduler* setpoint (00 for this example):

```
(PW) 20 9000 MPW 48 1 *
(PW) 28 00 9000 03 30 02 00 *
```

To manually set the clock 1-hour behind, enter the command:

```
(PW) 48 0 *
```

To automatically set the clock 1-hour behind on October 26, 1997, at 2 AM using the *Scheduler*, create a macro (9001 for this example) and a *Scheduler* setpoint (01 for this example):

```
(PW) 20 9001 MPW 48 2 *
(PW) 28 01 9001 10 26 02 00 *
```

Note: See Chapter 9, *Scheduler*, for more information on setting a *Scheduler* setpoint.

Reset Clock Seconds

Forces the clock to set the seconds to zero.

- This command simplifies the periodic synchronization of the clock to a time reference, either manually or automatically.
- If the seconds of the clock are ahead of the time reference by 1 to 29 seconds, the seconds will be reset to zero.
- If the seconds of the clock are behind the time reference by 1 to 30 seconds, the seconds will be reset to zero and the minute and hour will be incremented, if required.
- Don't use this command between 11:59 PM and 00:01 AM. Otherwise, the time will be adjusted, but the day will be wrong.

Command Form:

Command	Form	Data Digit
Reset Clock Seconds	(PW) 48 3 *	

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered

Default Condition: None

Example:

To manually reset the seconds of the clock, enter the command:

```
(PW) 48 3 *
```

When entering the command, press and hold the star (*) at the end of the command. Release the star when your time reference signals its zero mark. This will zero the seconds of the clock in synchronization with your time reference.

To automatically reset the seconds of the clock from external hardware, connect the hardware to a *Logic Input*. Create a macro (9000 in this example) and assign it to a *Logic Input* (the Hi-To-Low transition of #1 in this example):

```
(PW) 20 9000 (PW) 48 3 *
(PW) 26 20 9000 *
```

Note: See Chapter 14, *Logic Inputs*, for more information on using *Logic Inputs*.

Adjust Clock Seconds

Forces the clock to add or subtract seconds.

- This command simplifies the periodic synchronization of the clock without a time reference.
- This command is usually used with the *Scheduler* to allow the controller to adjust its own time.
- Don't use this command between 11:59 PM and 00:01 AM. Otherwise, the time will be adjusted, but the day will be wrong.
- Use the *Message Run-Time Variable* 9816, "Seconds, CW", or 9832 "Seconds, male voice" to check the amount of correction required.
- If you are using the *Scheduler* to automatically subtract seconds from the clock, use the version of the *Subtract Clock Seconds* command with the inhibit. This prevents the scheduler from executing the command more than once.

Command Form:

Command	Form	Data Digit
Add Clock Seconds	(PW) 48 4 (seconds) *	01-30 seconds
Subtract Clock Seconds	(PW) 48 5 (seconds)	01-30 seconds
Subtract Clock Seconds, Inhibited For 2 Minutes	(PW) 48 6 (seconds)	01-30 seconds

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: None

Example:

Using the *Scheduler*, the accuracy of the clock over long periods of time can be improved. To know how much adjustment will be required, use the *Reset Clock Seconds* command to manually synchronize the clock to a time reference. A week later, enter the command to speak the seconds, for example:

```
(PW) 15 9832 *
```

When entering the command, press and hold the star (*) at the end of the command. Release the star when your time reference signals its zero mark. This will cause the controller to speak the seconds reading on the clock at that time.

Note the amount that the clock is off from the reference. This is the amount of drift in the clock over a week. Take these readings each week at approximately the same time to understand the amount of drift.

Since the adjustment commands will only adjust the clock up to 29 seconds ahead or 30 seconds behind, you will need to set a *Scheduler* setpoint that occurs when the drift is less than that. Once-a-week or once-a-month may be appropriate depending on your situation.

To automatically adjust the seconds of the clock (subtract 7 seconds for this example) on the first Monday of every month at 2:00 AM using the *Scheduler*, create a macro (9000 for this example) and a *Scheduler* setpoint (00 for this example):

```
(PW) 20 9000 MPW 48 6 07 *
(PW) 28 00 9000 99 42 02 00 *
```

Note that the ambient temperature that the controller is subjected to may change the amount, and direction, of the clock drift. You may need to change the adjustment at different times of the year.

Note: See Chapter 9, *Scheduler*, for more information on setting a *Scheduler* setpoint.

Delete a Range of Setpoints

Deletes a range of setpoints from the scheduler program.

- Enter the first and last setpoint number to be deleted.
- Enter the 2-digit setpoints 00-99. Use a leading zero, if required.

Command Form:

Command	Form	Data Digit
Delete Range of Setpoints	(PW) 28 (first setpoint) (last setpoint)	00-99, setpoint number

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: No setpoints exist.

Example:

To delete setpoints 4 through 26, enter the following:

```
(PW) 28 04 26 *
```

To delete a single setpoint, 14, enter the following:

```
(PW) 28 14 14 *
```

Enable/Disable Scheduler

Allows the scheduler to process scheduled events (setpoints).

- Enter this command to control if the scheduler is allowed to process the programmed scheduled events (setpoints).
- Enter one digit, 0 for OFF (disabled), 1 for ON (enabled).

Command Form:

Command	Form	Data Digits
Enable/Disable Scheduler	(PW) 63 15 x *	0 = OFF (disabled) 1 = ON (enabled)

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: Enabled.

Example:

To disable the scheduler, enter the following:

```
(PW) 63 15 0 *
```

To enable the scheduler, enter the following:

```
(PW) 63 15 1 *
```

Chapter 10

CTCSS Functions

The 7K Controller can control an outboard CTCSS encoder/decoder module such as the Communications Specialists TS-32.

If the CTCSS encoder is connected to the 7K, the controller can turn the tone ON and OFF through a dedicated audio gate on the main board.

If the CTCSS decoder frequency is controlled by DIP switches, the 7K can change the frequency if connections are made between the DIP switches and the 7K's PLF1 through PLF6 outputs.

Enable/Disable CTCSS Encoder

Turns ON and OFF a customer-supplied CTCSS encoder.

- Feed the encoder audio output into the 7K at J2-23 (*PL Encode In)*, and drive the transmitter PL input from the 7K at J2-24 (*PL Encode Out*).
- You may place the encoder into one of three modes: OFF (disabled), continuously ON (continuously enabled), and timed ON (timed enabled).
- When continuously enabled, the encoder will be enabled when Transmitter 1 is keyed and disabled just before the *Tx1 Minimum Unkey Delay*. You can adjust the *Tx1 Minimum Unkey Delay* (see page 17-15) for proper squelching of user radios.
- The *Timed ON* mode means the encoder is turned ON for an adjustable amount of time at the beginning of each repeater key-up. This time is adjustable from 2 seconds to 9 seconds.
- Enter one digit, 0 for OFF (disabled), 1 for continuously ON (enabled), and 2 through 9 for 2 to 9 seconds of timed ON operation.

Command Form:

Command	Form	Data Digit
Enable/Disable CTCSS Encoder	(PW) 02 x *	0 = OFF (disabled) 1 = continuous ON (2-9) = (2-9) seconds timed ON (enabled)

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: CTCSS Encoder is OFF (disabled).

Example:

To put the CTCSS encoder into timed ON mode for 7 seconds, enter the following:

```
(PW) 02 7 *
```

If monitoring stations have CTCSS decoders, they can hear the beginnings of QSOs and find out who's on the air, but do not have to listen to the rest of the conversation.

Select DTMF Decoder Access Mode

Selects one of six possible DTMF Decoder Access Modes for each receiver.

- Enter one digit, 0 through 5, from the table below.

Command Form:

Command	Form	Data Digit
Select Rx1-to-DTMF Decoder Access Mode	(PW) 57 06 x *	DTMF Decoder Access Mode Table (below)
Select Rx2-to-DTMF Decoder Access Mode	(PW) 57 07 x *	DTMF Decoder Access Mode Table (below)
Select Rx3-to-DTMF Decoder Access Mode	(PW) 57 08 x *	DTMF Decoder Access Mode Table (below)

Mode	DTMF Access	Explanation
0	No Access	Activity on the COR and PL inputs is ignored.
1	Carrier Access	Activity on the COR input will allow access to the DTMF decoder. Activity on the PL input is ignored.
2	PL Access	Activity on the PL input will allow access to the DTMF decoder. Activity on the COR input is ignored.
3	And-PL Access	Activity on both the COR and PL inputs simultaneously will allow access to the DTMF decoder.
4	Or-PL Access	Activity on either the COR or PL inputs will allow access to the DTMF decoder.
5	Anti-PL Access	Activity on the COR input simultaneously with no activity on the PL input will allow access to the DTMF decoder.

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: DTMF Decoder Access is Mode 1 (Carrier Access) on all receivers.

Note: These commands only affect the DTMF Decoder access mode. They may be different from receiver access modes, if desired.

Warning: If you set the DTMF Decoder Access Mode on all receivers to Mode 0 (No Access) you will only be able to control the controller via the phone line!

Example:

To prevent DTMF commands from being decoded from Receiver 2, enter the following command to change the mode to Mode 0 (No Access):

```
(PW) 57 07 0 *
```

Assume that the DTMF decoder for Receiver 1 is in Mode 1 (Carrier Access), and that Mode 2 (PL Access) is desired. Enter the following command to change the mode on Receiver 1:

```
(PW) 57 06 2 *
```

A better mode for many repeater installations is Mode 3 (And-PL Access). This mode has better rejection of adjacent-channel interference than Mode 2 (PL Access), since noise falsing from unsquelched audio is eliminated. Enter the following command to change the mode on Receiver 1:

```
(PW) 57 06 3 *
```

Mode 4 (Or-PL Access) allows both Carrier Access and PL Access operation. Since PL is more easily detected, PL users will find increased range. Carrier Access users are unaffected. The squelch may be tightened to suppress band opening problems.

Mode 5 (Anti-PL) is used when the repeater is on the same channel with a PL-accessed repeater. Users of the second system are kept out of the Anti-PL system.

Chapter 12
Identifier

The Controller supports separate *Identifiers* (ID) for Transmitter #1 (Tx1) and Transmitter #2 (Tx2). These identifiers are triggered by incoming signals from the users and identify the transmitters only while they are being used.

Note: Due to the separate identifiers feature, many of the commands and messages are specific to a particular transmitter. In the following text, all references to commands, messages, macros, and so forth, may not include distinctions for each transmitter. For example, we might refer to an *Initial ID Message* command, when in fact, there are two commands that are similar: *Select Initial ID Message for Tx1* and *Select Initial ID message for Tx2*. Therefore, users should be careful to choose the proper command form from the command pages.

The first signal to be received will start an *ID Cycle*. Since the identifier is "polite", it will attempt to wait for the signal to disappear before sending an identifier message. If the initial signal is received continuously until the identifier timer expires, the *Initial ID Message* will be sent and the *Impolite ID Macro* will be executed. Normally, following the initial keyup, the *Initial ID Message* is sent and the *Initial ID Macro* is executed for each transmitter that was keyed

During a conversation, the controller looks for the input signal to drop during the *ID Pending Interval* prior to the expiration of the *ID Message Interval* timer. If the signal drops during this period, the *Normal ID Message* is sent and the *Polite ID Macro* is executed. If the signal does not drop by the time the *ID Message Interval* time expires, the *Impolite ID Message* is sent and the *Impolite ID Macro* is executed.

Because the controller "looks ahead" up to the *ID Pending Interval* time for the signal to drop (as required by the polite ID feature), the identification may not happen at precisely the same interval each time. If the *ID Message Interval* is set to 10 minutes and the *ID Pending Interval* is set to 30 seconds, for example, the identification can take place from 9 minutes 30 seconds to 10

minutes after the initial signal is received. The *Select ID Message Interval for Tx1 and Tx2* command (see page 12-5) sets the *maximum* interval between identifications. The *Select ID Pending Interval for Tx1 and Tx2* command (see page 12-14) sets the amount of time that the controller "looks ahead" to insert a polite ID and Select ID Message Interval minus Select ID Pending Interval sets the minimum time between IDs on an active system.

When the conversation is finished and the ID timer expires for the last time, the *Normal ID Message* is sent and the *Polite ID Macro* is executed. The identifier always has the "last word". No additional identification will be sent until a new ID cycle is begun by an incoming signal.

You may program messages into the identifier by using the *Select Identifier Messages* commands on page 12-9.

- The *Initial ID Message* may contain a greeting, club name, city, CTCSS frequency, or other such information in addition to the callsign.
- The *Normal ID Message* is usually short, containing only the callsign, since it is sent occasionally throughout a conversation between user transmissions.
- The *Impolite ID Message* should be as short and inconspicuous as possible since it is sent over a user's transmission when a *Normal ID Message* cannot be inserted between users' transmissions.

The ID messages can be deleted and the ID macros used instead. For example, the *Initial ID Macro* can pulse a logic output, starting a tape cartridge machine or digital voice recorder on which the identification and greeting are recorded.

Select (Review) Identifier Messages

Define the Initial ID, Normal ID, and Impolite ID Messages for Tx1 and Tx2.

- Any message may be a combination of message types including CW, beeps, page tones, speech, etc.
- The maximum size of any message is 50 bytes (50 2-digit codes). You must count the control characters. Therefore, any message could have 46 CW characters, 23 synthesized speech words, etc.
- To delete a message, enter the password, the 4-digit root number, and the (*); do not enter any message.
- If an Impolite ID Message is not programmed, the Normal ID message is sent.

Command Form:

Command	Form	Default
Select Initial ID Message for TX1	(PW) 31 30 (message) *	ID in CW
Select Normal ID Message for TX1	(PW) 31 31 (message) *	ID in CW
Select Impolite ID Message for TX1	(PW) 31 32 (message) *	none
Select Initial ID Message for TX2	(PW) 31 33 (message) *	9983 ID in CW
Select Normal ID Message for TX2	(PW) 31 34 (message) *	9983 ID in CW
Select Impolite ID Message for TX2	(PW) 31 35 (message) *	none
Review Initial ID Message for TX1	(PW) 34 30 *	none
Review Normal ID Message for TX1	(PW) 34 31 *	none
Review Impolite ID Message for TX1	(PW) 34 32 *	none
Review Initial ID Message for TX2	(PW) 34 33 *	none
Review Normal ID Message for TX2	(PW) 34 34 *	none
Review Impolite ID Message for TX2	(PW) 34 35 *	none

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: TX1 is ID, TX2 is 9983 ID, both in CW.

Note: Be sure to enter a routing code for messages to TX2 or the message will go to TX1 instead.

Select (Review) Programmable Tail Messages for Tx1

Defines the Initial and Normal ID Programmable Tail Messages for Tx1.

- A Tail Message is sent immediately after its associated ID Message.
- Tail Messages provide a simple way to turn on and off a supplemental message using the *Select ID Tail Message* command (see page 12-11).
- Any Programmable Tail Message may be a combination of message types including CW, beeps, page tones, speech, etc.
- The maximum size of any message is 50 bytes (50 2-digit codes). You must count the control characters. Therefore, any message could have 46 CW characters, 23 synthesized speech words, etc.
- To delete a message, enter the password, the 4-digit root number, and the (*); do not enter any message.
- This procedure only establishes the contents of the programmable message. Use the Select (Review) Initial and Normal ID Tail Messages Command (see page 12-11) to enable the message.

Command Form:

Command	Form	Default
Select Initial ID Programmable Tail Message for TX1	(PW) 31 28 (message) *	none
Select Normal ID Programmable Tail Message for TX1	(PW) 31 29 (message) *	none
Review Initial ID Programmable Tail Message for TX1	(PW) 34 28 *	none
Review Normal ID Programmable Tail Message for TX1	(PW) 34 29 *	none

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: No message is programmed.

Example:

To program the Initial ID Programmable Tail Message for TX1 to say “Net at 8 PM”, enter the command:

```
(PW) 31 28 9960 0331 0039 0129 0369 0287 *
```

Select (Review) Initial and Normal ID Tail Messages

Defines the Initial and Normal ID Tail Messages for Tx1.

- *Tail Messages* are short CW or programmable messages that can be appended to an ID message.
- The *Tail Number* (Data Digit "x") can be 1 or 2 digits selected from the following table.
- Enter the command with no *Tail Number* to disable the *Tail Message*.

Command Form:

Command	Form	Data Digit
Select Initial ID Tail Message for TX1	(PW) 50 0 xx *	Tail Message Table (below)
Select Normal ID Tail Message for TX1	(PW) 50 1 xx *	Tail Message Table (below)
Review Initial ID Tail Message for TX1	(PW) 50 0 99 *	none
Review Normal ID Tail Message for TX1	(PW) 50 1 99 *	none

Data Digit	Message	Data Digit	Message	Data Digit	Message
0	(no message)	6	WX in CW	12	/R in CW
1	FEST in CW	7	ALERT in CW	13	LINK in CW
2	DUES in CW	8	WATCH in CW	14	RMT in CW
3	MEET in CW	9	WARN in CW	15	BAT in CW
4	NET in CW	10	RACES in CW	98	(programmable)
5	HI in CW	11	TGIF in CW	(none)	(no message)

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: Both Initial and Normal ID Tail Messages default to none.

Example:

To select NET in CW as an Initial ID Tail Message for TX1, enter the command:

```
(PW) 50 0 4 *
```

Enable/Disable ID Messages During Autopatch

Allows the Identifier to operate during an autopatch and reverse patch.

- Enter this command to allow the identifier to operate during an autopatch.
- Enter one digit, 0 for OFF (disabled), 1 for ON (enabled).
- By default, the identifier is disabled during an autopatch.
- This command has no effect if executed during an autopatch. This command will take effect on the next autopatch

Command Form:

Command	Form	Data Digits
Enable/Disable ID During Autopatch	(PW) 63 09 x *	0 = OFF (disabled) 1 = ON (enabled)

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: Disabled.

Example:

To enable the identifier during a patch, enter the following:

```
(PW) 63 09 1 *
```

To disable the identifier during a patch, enter the following:

```
(PW) 63 09 0 *
```

Select ID Pending Interval For Tx1 and Tx2

Programs the amount of time the controller "looks ahead" to send a polite ID.

- The *Pending ID Interval* is the amount of time before the end of the *ID Message Interval* (see page 12-5) that the controller looks for the repeater's carrier to drop to insert a polite ID.
- A longer interval allows more time for a polite ID to occur, but can cause an ID to occur more often than required.
- Enter 1, 2, 3, or 4 digits, leading zeroes are not required.

Command Form:

Command	Form	Data Digits
Select ID Pending Interval for Tx1 and Tx2	(PW) 49 97 xxxx *	(0300-1800) = 30.0-180.0 seconds

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: The ID Pending Interval is 30 seconds.

Example:

To select an ID Pending Interval of 2 minutes (120.0 seconds), enter the following:

```
(PW) 49 97 1200 *
```

Select Path Access Mode

Selects one of 7 possible Access Modes for each receiver-to-transmitter path.

- Enter the command to select the path to modify; replace the 'x' with one digit, 0 through 6, from Patch Access Mode table below.

Command Form:

Command	Form	Data Digit
Select Rx1-to-Tx1 Access Mode	(PW) 57 00 x *	Path Access Mode Table (below)
Select Rx2-to-Tx1 Access Mode	(PW) 57 01 x *	Path Access Mode Table (below)
Select Rx3-to-Tx1 Access Mode	(PW) 57 02 x *	Path Access Mode Table (below)
Select Rx1-to-Tx2 Access Mode	(PW) 57 03 x *	Path Access Mode Table (below)
Select Rx2-to-Tx2 Access Mode	(PW) 57 04 x *	Path Access Mode Table (below)
Select Rx3-to-Tx2 Access Mode	(PW) 57 05 x *	Path Access Mode Table (below)

Path Access Modes:

Mode	DTMF Access	Explanation
0	No Access	Activity on the COR and PL inputs is ignored.
1	Carrier Access (COR)	Activity on the COR input will enable the path. Activity on the PL input is ignored.
2	PL Access	Activity on the PL input will enable the path. Activity on the COR input is ignored.
3	COR-And-PL Access	Activity on both the COR and PL inputs simultaneously will enable the path.
4	COR-Or-PL Access	Activity on either the COR or PL inputs will enable the path.
5	COR–And-Anti-PL Access	Activity on the COR input simultaneously with no activity on the PL input will enable the path.
6	Always Access	Activity on the COR and PL inputs is ignored. The path is always enabled.

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered

? err 2	illegal digit entered

Default Condition: Path Access is Mode 1 (Carrier Access) on all receivers to all transmitters.

Note: These commands only affect the path access modes. They may be different from DTMF Decoder access modes, if desired.

Examples:

To prevent audio from Receiver 2 from being routed to Transmitter 1, enter the following command to change the mode to Mode 0 (No Access):

```
(PW) 57 01 0 *
```

Assume that the path for Receiver 1 to Transmitter 1 is in Mode 1 (Carrier Access), and that Mode 2 (PL Access) is desired. Enter the following command to change the mode:

```
(PW) 57 00 2 *
```

A better mode for many repeater installations is Mode 3 (And-PL Access). This mode has better rejection of adjacent-channel interference than Mode 2 (PL Access), since noise falsing from unsquelched audio is eliminated. Enter the following command to change the mode on the path from Receiver 1 to Transmitter 1 to Mode 3 (And-PL Access):

```
(PW) 57 00 3 *
```

Mode 4 (Or-PL Access) allows either Carrier Access or PL Access operation. Since PL is more easily detected, PL users will find increased range. Carrier Access users are unaffected. The squelch may be tightened to suppress band-opening problems.

Mode 5 (Anti-PL) is used when the repeater is on the same channel with a PL-accessed repeater. Users of the second system are kept out of the Anti-PL system.

Mode 6 (Always Access) can be used to troubleshoot a receiver that may be generating a bad COR signal or to enable an audio source that does not generate a COR. To enable the path from Receiver 3 to Transmitter 1 without the presence of a COR or PL signal, enter the following:

```
(PW) 57 02 6 *
```

To disable this path, enter the following:

```
(PW) 57 02 0 *
```

Select Transmitter PTT-Triggered Macros

Allows the programmer to execute macros based on transmitter keying.

- Each transmitter has its own *PTT Inactive-to-Active Macro*, *PTT Active-to-Inactive Before Unkey Delay Macro*, and *PTT Active-to-Inactive Macro*.
- Enter the password, the 4-digit root number, and the 4-digit name of the macro you wish to have executed at the transition, and the (*).
- If the macro name has fewer than 4 digits, enter leading zeros.
- If you wish to prevent a macro from being executed that was previously assigned, enter just the password, the 4-digit root number, and the (*).

Command Form:

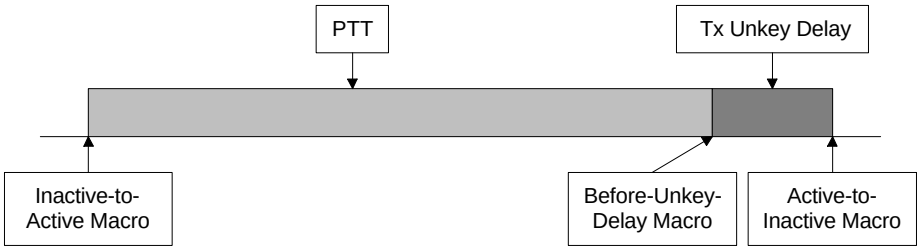
Command	Form
Assign Macro to Tx1 PTT Inactive-to-Active	(PW) 26 82 (macro name) *
Assign Macro to Tx1 PTT Active-to-Inactive Before Unkey Delay	(PW) 26 83 (macro name) *
Assign Macro to Tx1 PTT Active-to-Inactive	(PW) 26 84 (macro name) *
Assign Macro to Tx2 PTT Inactive-to-Active	(PW) 26 85 (macro name) *
Assign Macro to Tx2 PTT Active-to-Inactive Before Unkey Delay	(PW) 26 86 (macro name) *
Assign Macro to Tx2 PTT Active-to-Inactive	(PW) 26 87 (macro name) *

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: No macros assigned.



Example 1:

PTT-triggered macros provide a way to generate messages, control logic outputs, start timers, etc., for functions that need to be synchronized to a transmitter's operation. The Inactive-to-Active macro is executed when the transmitter is keyed. The Active-to-Inactive macro is executed when the transmitter is unkeyed. The Active-to-Inactive Before Unkey Delay macro is executed a programmable amount of time before the transmitter is actually unkeyed.

As an example, let's say that you have a CTCSS encoder on your repeater transmitter and your repeater users program their radios to only open their receivers when a CTCSS tone is present. If the CTCSS tone is always present on your transmitter, then, when the transmitter unkeys, a squelch burst is heard in your users' receivers. To prevent the squelch burst, you could disable the CTCSS tone on your transmitter a small amount of time before the transmitter is unkeyed so that the users' receivers would close before the squelch burst could occur.

To control a CTCSS encoder, you would write two macros and assign them to the Inactive-to-Active and Active-to-Inactive Before Unkey Delay-triggered macros to enable and disable the CTCSS encoder using a Logic Output.

To create a macro that turns on Logic Output 7 to enable the CTCSS encoder, enter the following:

```
(PW) 20 9107 (PW) 70 7 *
```

To create a macro that turns off Logic Output 7 to disable the CTCSS encoder, enter the following:

```
(PW) 20 9108 (PW) 71 7 *
```

To assign these macros to the PTT-triggered events, enter the following:

```
(PW) 26 82 9107 *
(PW) 26 83 9108 *
```

To adjust the amount of time that the transmitter stays keyed after the tone encoder is disabled, set the Transmitter Minimum Unkey Delay (see page 17-15). For example, to set the Tx1 Minimum Unkey Delay to 0.4 seconds, enter the following:

```
(PW) 49 98 4 *
```

Note: an alternate way to control a CTCSS tone on Transmitter 1 is to use the controller's dedicated CTCSS audio gate (see page 10-2). When enabled, this audio gate opens to pass audio when Transmitter 1 is keyed and closes at the beginning of the Tx1 Minimum Unkey Delay. You would use the Select Tx1 Minimum Unkey Delay command as in the example above to adjust the amount of time the transmitter stays keyed after the CTCSS encoder is disabled. This method does not require the use of PTT-triggered macros.

Example 2:

The PTT-triggered macros can be used with the User Timers to control external equipment that should operate for a time after a transmitter is unkeyed. See page 20-7 for an example of controlling a fan.

Select Transmitter Minimum Unkey Delay

Programs the minimum amount of time for a transmitter to unkey.

- A Transmitter 1 Minimum Unkey Delay can be programmed from 0.1 to 1.0 second.
- A Transmitter 2 Minimum Unkey Delay can be programmed from 0 to 655.3 seconds.
- Enter the timeout value as 1, 2, 3, or 4 digits, leading zeroes are not required.
- A programmed Minimum Unkey Delay will not be present unless it is enabled using the *Enable/Disable Transmitter Minimum Unkey Delay* command (see page 17-11).

Command Form:

Command	Form	Data Digit
Select Tx1 Minimum Unkey Delay	(PW) 49 98 xx *	from table below
Select Tx2 Minimum Unkey Delay	(PW) 49 99 xx *	from table below

Data Digit	Explanation
seconds for Tx1, 01-10	seconds in 0.1 second increments from 0.1 to 1.0 second as 1 or 2 digits
seconds for Tx2, 0000-6553	seconds in 0.1 second increments from 0.0 to 655.3 seconds as 1, 2, 3, or 4 digits

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	invalid timer or seconds parameter

Default Condition: None.

Example:

To set the Transmitter 1 Minimum Unkey Delay to 0.4 second, enter the command:

```
(PW) 49 98 4 *
```

To set the Transmitter 2 Minimum Unkey Delay to 5.0 seconds, enter the command:

```
(PW) 49 99 50 *
```

Select (Review) Courtesy Messages

Program unique Courtesy Messages for each receiver.

- Enter the password, the 4-digit root number, the desired message, and a (*).
- Any message may be any combination of message types including CW, beeps, page tones, speech, etc.
- The maximum size of any message is 50 bytes (50 2-digit codes).
- You must count the control character. Therefore, any message could have 46 CW characters, 23 synthesized speech words, and so on.
- To delete a message, enter the password, the 4-digit root number, and the (*). Do not enter any message.

Command Form:

Command	Form
Select Courtesy Message for Rx1	(PW) 31 10 (message) *
Select Courtesy Message for Rx2	(PW) 31 11 (message) *
Select Courtesy Message for Rx3	(PW) 31 12 (message) *
Review Courtesy Message for Rx1	(PW) 34 10 *
Review Courtesy Message for Rx2	(PW) 34 11 *
Review Courtesy Message for Rx3	(PW) 34 12 *

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition:

Command	Default Condition
Select Courtesy Message for Rx1	60mS 440 Hz beep (9910 74 09)
Select Courtesy Message for Rx2	60mS 660 Hz beep (9910 74 16)
Select Courtesy Message for Rx3	60mS 880 Hz beep (9910 74 21)

Example:

Suppose we want to change the courtesy message for Receiver 1 to a burst of 2 beeps. We want the two beeps to be 25 and 21, we want them to be 40mS in duration, and we want no gap between them.

Looking up this information in the *Beep Character Set Tables* beginning on page A-5, we find: 55 turns the automatic beep gap OFF; 73 changes the beep duration to 40mS; and, the control character for a beep message is 9910. Therefore, the complete command to change the courtesy message is:

```
(PW) 31 10 9910 55 73 25 21 *
```

Select Repeater Action-Triggered Macros

Allows the programmer to execute macros based on repeater activity.

- Macros can be executed based on receiver activity, receiver inactivity and when a courtesy message is sent.
- Enter the password, the 4-digit root number, and the 4-digit name of the macro you wish to have executed at the transition, and the (*).
- If the macro name has fewer than 4 digits, enter leading zeros.
- If you wish to prevent a macro from being executed that was previously assigned, enter just the password, the 4-digit root number, and the (*).

Command Form:

Command	Form
Assign Macro to Any-Receiver-Active	(PW) 26 82 (macro name) *
Assign Macro to All-Receivers-Inactive	(PW) 26 83 (macro name) *
Assign Macro to Courtesy Message	(PW) 26 84 (macro name) *
Assign Macro to Repeater Timeout	(PW) 26 85 (macro name) *
Assign Macro to Return-From-Repeater-Timeout	(PW) 26 86 (macro name) *

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: No macros assigned.

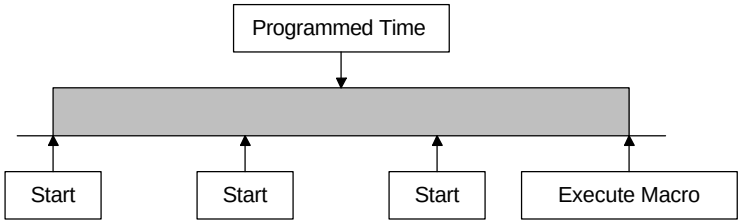
Chapter 20
User Timers

The Controller features 10 *User Timers*. These timers can be used to implement timed operations not otherwise implemented by the controller.

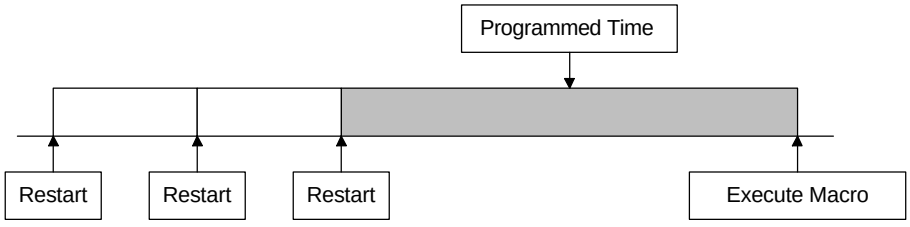
The *User Timers* can be set in 0.1-second increments to 655.3 seconds (slightly less than 11 minutes). When a timer times out, an event macro is executed to perform a user-defined operation.

The *User Timers* can be operated as “one-shot” timers or as “retriggerable” timers.

- *One-shot timers* are timers that are started and will time to completion. Even if the start command is executed again, the duration of the timer will be measured from the first start request:



- *Retriggerable* timers are timers that are started and can be restarted during their programmed time. When retriggerable timers do time out, the time period will be the full programmed time from the last restart command:



Select Timeout Value

Programs the duration of a *User Timer*.

- The range of a one-shot or a retriggerable timer is from 0.1 second to 655.3 seconds.
- Enter the 2-digit number to select a timer. Use a leading zero.
- Enter the timeout value as 1, 2, 3, or 4 digits, leading zeroes are not required.
- If the timer is running when this command is executed, the timer continues to run until this new timeout value is reached. But, if the new timeout value is less than the time already expired on the timer the new timeout value is set, the timer is stopped, and the macro assigned to the timer is executed.

Command Form:

Command	Form	Data Digit
Set Timer Timeout Value	(PW) 49 (timer) 03 (seconds) *	from table below

Data Digit	Explanation
timer, 00-09	select one of 10 timers, 2 digits are required
seconds, 0001-6553	seconds in 0.1 second increments from 0.1 to 655.3 seconds as 1, 2, 3, or 4 digits

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	invalid timer or seconds parameter

Default Condition: None.

Example:

To set the timeout duration of timer 00 to 27.0 seconds, enter the command:

```
(PW) 49 00 03 270 *
```

To set the timeout duration of timer 07 to 8 minutes (480 seconds), enter the command:

```
(PW) 49 07 03 4800 *
```

Select Timer Event Macro

Assigns the macro to be triggered when the one-shot or retriggerable timer times out.

- Enter the 2-digit timer number and 4-digit macro name to be called upon timeout of the timer. Use leading zeros if required.
- To remove the assignment to the macro, enter the command with no macro name.
- If the timer is running when this command is executed, the timer will continue to run. The last macro entered by this command will be executed at the end of the timer period.

Command Form:

Command	Form	Data Digit
Assign Timer Event Macro	(PW) 49 (timer) 02 (macro name) *	from table below
Unassign Timer Event Macro	(PW) 49 (timer) 02 *	from table below

Data Digit	Explanation
timer, 00-09	select one of 10 timers, 2 digits are required
macro name	the name of the macro to be triggered

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: No macro assigned.

Example:

To assign macro 9101 to timer 00, enter the command:

```
(PW) 49 00 02 9101 *
```

To assign macro 9 to timer 04, enter the command:

```
(PW) 49 04 02 0009 *
```

Stop Timer

Stops the one-shot or retriggerable timer.

- Enter the 2-digit timer number. Use a leading zero.
- If the timer is running, it is stopped without triggering the macro.
- If the timer is stopped or has timed out, this command has no effect.

Command Form:

Command	Form	Data Digit
Stop Timer	(PW) 49 (timer) 00 *	from table below

Data Digit	Explanation
timer, 00-09	select one of 10 timers, 2 digits are required

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: None.

Example:

To stop timer 00, enter the command:

```
(PW) 49 00 00 *
```

To stop timer 09, enter the command:

```
(PW) 49 09 00 *
```

Start Timer (Retriggerable)

Starts the selected timer as a retriggerable timer.

- Enter the 2-digit timer number. Use a leading zero.
- If the timer is stopped, the timer is reset to zero time expired and started.
- If the timer is running, the timer is reset to zero time expired and continues.

Command Form:

Command	Form	Data Digit
Start/Restart Timer (Retriggerable)	(PW) 49 (timer) 01 *	from table below

Data Digit	Explanation
timer, 00-09	select one of 10 timers, 2 digits are required

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: None.

Example:

To start retriggerable timer 00 or retrigger it, enter the command:

```
(PW) 49 00 01 *
```

To start retriggerable timer 02 or retrigger it, enter the command:

```
(PW) 49 02 01 *
```

Start Timer (One-Shot)

Starts the selected timer as a one-shot timer.

- Enter the 2-digit timer number. Use a leading zero.
- If the timer is stopped, the timer is set to zero time expired and started.
- If the timer is running, the command is ignored.

Command Form:

Command	Form	Data Digit
Start Timer (One-Shot)	(PW) 49 (timer) 04 *	from table below

Data Digit	Explanation
timer, 00-09	select one of 10 timers, 2 digits are required

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: None.

Example:

To start one-shot timer 00, enter the command:

```
(PW) 49 00 04 *
```

To start one-shot timer 08, enter the command:

```
(PW) 49 08 04 *
```

Example: Fan Control

Installing a fan to cool a repeater or link transmitter is always a good idea. It can extend the life of the transmitter significantly. But, leaving the fan running all the time will shorten the life of the fan.

To extend the life of the fan, the fan can be operated whenever the transmitter is keyed and for a couple of minutes after. A *User Timer* can be used to control the amount of time the fan stays on after the transmitter unkeys.

Three macros will be required to implement the fan control: one is triggered when the transmitter is keyed, a second is triggered when the transmitter is unkeyed, and a third is triggered when the timer times out. To control the fan, a *Logic Output* will be used to power the fan through a switching device, e.g. a relay or HexFET.

For this example, we'll create macros 8701, 8702, and 8703. We'll use timer #9 and logic output #1.

First, setup the timer and assign the macros.

```
; Setup
(PW) 49 09 03 1200 *   ; Set Timer 120.0 seconds
(PW) 49 09 02 8703 *   ; Set Timer Macro
(PW) 26 82 8701 *      ; Set Tx1 Active Macro
(PW) 26 84 8702 *      ; Set Tx1 Inactive Macro
```

Enter the macro that is triggered when the transmitter is keyed. This macro stops the timer and enables the logic output to activate the fan for the entire time that the transmitter is keyed.

```
; Macro: Tx1 Active: Stop Timer, Logic Out On
(PW) 20 8701 (PW) 49 09 00 *  ; stop timer
(PW) 29 8701 (PW) 70 1 *      ; Logic Out 1 ON
```

Enter the macro that is triggered when the transmitter is unkeyed. This macro starts the timer and leaves the fan on.

```
; Macro: Tx1 Inactive
(PW) 20 8702 (PW) 49 09 01 *  ; start timer
```

Enter the macro that is triggered when the timer times out. This macro turns off the fan.

```
; Macro: Timer Timeout
(PW) 20 8703 (PW) 71 1 *      ; Logic Out 1 OFF
```

Example: An Activity Timer

The repeater and each receiver input has an activity timer available to cause a macro to be triggered after activity on the repeater has ceased. But, sometimes one activity timer is not enough. A *User Timer* can be used to implement one or more additional activity timers.

Three macros will be required to implement the activity timer: one is triggered when the repeater is activated by a receiver, a second is triggered when all receivers are inactive, and a third is triggered when the timer times out. Our example triggers a macro that speaks a message, but any commands can be executed at that time.

For this example, we'll create macros 8711, 8712, and 8713. We'll use timer #8.

First, setup the timer and assign the macros.

```
; Setup
(PW) 49 08 03 3000 *   ; Set Timer 300.0 seconds
(PW) 49 08 02 8713 *   ; Set Timer Macro
(PW) 26 11 8711 *      ; Set Any-Rx-Active Macro
(PW) 26 09 8712 *      ; Set All-Rx-Inactive Macro
```

Enter the macro that is triggered when any receiver is active. This macro stops the timer.

```
; Macro: Any-Rx-Active: Stop Timer
(PW) 20 8711 (PW) 49 08 00 *  ; stop timer
```

Enter the macro that is triggered when all receivers are inactive. This macro starts the timer.

```
; Macro: All-Rx-Inactive
(PW) 20 8712 (PW) 49 08 01 *  ; start timer
```

Enter the macro that is triggered when the timer times out. This macro can perform any operation, but in our example it speaks a message.

```
; Macro: Timer Timeout, speak 1-second-pause + "Net"
(PW) 20 8713 (PW) 15 9960 0000 0331 *
```

Chapter 21
Remote Base Interface

Your controller has many features that allow you to customize the operation of the controller when connected to a *Doug Hall Electronics RBI-1 Remote Base Interface*. All of the capabilities of the *RBI-1* are supported.

The 7K Remote Base Interface has the following features:

- All remote base user functions use a password that is different from the *Master*, *Control Operator*, or *Autopatch Passwords* defined within the controller. Because of this, users do not need to know these passwords to use the remote base functions.
- User functions are optimized to minimize the number of keystrokes users must enter to perform common functions.
- Macros can be used to define memory channels.
- Direct frequency entry allows easy frequency and transmitter offset changes.
- The time-of-day scheduler can be used to control when the remote base functions are available.
- The controller can speak the current radio configuration.
- Eight additional logic outputs on the *RBI-1* are available for controlling external devices.

Remote Base Setup and Configuration

Wiring

You will need to wire the *RBI-1* to the controller using the connections shown in the table, below. The first three wires allow the controller to send commands to the *RBI-1*. The rest of the wires connect the *RBI-1* to the controller's Receiver 2 and Transmitter 2 connections.

7K	*RBI-1*	Purpose
J3 Pin 16	J2 Pin 1	*RBI-1* Reset
J3 Pin 17	J2 Pin 4	*RBI-1* Clock
J3 Pin 18	J2 Pin 3	*RBI-1* Data
J3 Pin 25	J2 Pin 9	Ground
J2 Pin 8	J2 Pin 6	Rx2 Audio In
J2 Pin 22		Shield
J2 Pin 15	J2 Pin 5	Tx2 Audio Out
J2 Pin 19		Shield
J2 Pin 3	J2 Pin 7	Rx2 COR
J2 Pin 11	J2 Pin 8	Tx2 PTT

Switch Setting

DIP Switch #2 is used to invert the Receiver 2 COR signal from the *RBI-1*. Set the dip switch as follows:

DIP Switch #2 = OFF. This inverts COR #2 for Rx2.

Software Configuration

The radios connected to the *RBI*-1 only operate half-duplex -- they cannot transmit and receive at the same time. The *Link Paths* of the controller define which receivers are connected to which transmitters. By default, Receiver 2 is connected to Transmitter 2. This link path must be disabled for proper operation of the remote base interface.

```
(PW) 63 85 0 *  ;Disable Path 5 (Rx2 to Tx2)
```

By default, the controller will send an identifier message to Transmitter 2. Delete this message if you don't want to send an ID message.

```
(PW) 31 33 *    ;Delete Initial ID Message for Tx2
(PW) 31 34 *    ;Delete Normal ID Message for Tx2
```

By default, the *7K* will mute all DTMF tones from Receiver 1 to Transmitter 2. If you wish to pass tones to Transmitter 2, enter the following command:

```
(PW) 63 53 0 *  ;Disable Rx1-Tx2 DTMF Mute
```

By default, the remote base is disabled. To enable it for use, enter the following command:

```
(PW) 63 71 1 *  ;Enable Remote Base
```

Event Triggered Macros

The system owner **must** create two macros that are triggered by user function access to the remote base interface. These *Event-Triggered Macros* allow the users to enter simple user function commands to access the remote base to make use of it, and to dump the remote base when they are done with it.

Below are the recommended macros to use for this function. They can be modified or enhanced as necessary.

Define a *Remote Base Access-Triggered Macro* to allow a user to access the remote base interface. This macro is invoked automatically by the *User Function: Access Remote Base* command. This macro enables the link paths from the repeater receiver and transmitter and the remote base receiver and transmitter. In addition, a message is sent to the user as an acknowledgment that the remote base is now available.

```
(PW) 20 9000 (PW) 63 82 1 * ;Enable Path 2 (RX2 to TX1)
(PW) 29 9000 (PW) 63 84 1 * ;Enable Path 4 (RX1 to TX2)
;Send “Remote Up” Tones
(PW) 29 9000 (PW) 15 9910 54 48 49 50 *
```

Assign this macro to the *Remote Base Access-Triggered Macro* by entering the following command:

```
(PW) 26 91 9000 *
```

Define a *Remote Base Dump-Triggered Macro* to allow a user to terminate access to the remote base interface. This macro is invoked automatically by the *User Function: Dump Remote Base* command. This macro disables the link paths between the repeater receiver and transmitter and the remote base receiver and transmitter. In addition, a message is sent to the user as an acknowledgment that the remote base is no longer available.

```
(PW) 20 9001 (PW) 63 82 0 * ;Disable RX2 to TX1
(PW) 29 9001 (PW) 63 84 0 * ;Disable RX1 to TX2
; Send “Remote Down” Tones
(PW) 29 9001 (PW) 15 9910 54 50 49 48 *
```

Assign this macro to the *Remote Base Dump-Triggered Macro* by entering the following command:

```
(PW) 26 90 9001 *
```

Assign Remote Base Password

Assigns a new password for remote base users.

- The new *Remote Base Password* may be 2, 4, or 6 digits in length.
- The new *Remote Base Password* may be any combination of the numbers 0-9 and the letters A-D.

Command Form:

Command	Form
Assign Remote Base Password	(PW) 39 02 (new remote base password) *

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered

Default Condition: *Remote Base Password* defaults to 98.

Example:

To change the remote base password to 22, enter the following:

```
(PW) 39 02 22 *
```

Select Remote Base Access- and Dump-Triggered Macros

Assigns macros to be executed upon accessing or dumping the remote base.

- Enter the password, the 4-digit root number, and the 4-digit name of the macro you wish to have executed at the transition, and the (*).
- If the macro name has fewer than 4 digits, enter leading zeros.
- If you wish to prevent a macro from being executed that was previously assigned, enter just the password, the 4-digit root number, and the (*).

Command Form:

Command	Form
Select Remote Base Access-Triggered Macro	(PW) 26 91 (macro name) *
Select Remote Base Dump-Triggered Macro	(PW) 26 90 (macro name) *

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: No macros assigned.

Example:

These commands make the remote base interface much more flexible. For example, when a user enters the *Access Remote Base* command, a macro can be executed to enable the controller link paths, power up a remote base radio, set the frequency, select an antenna, and rotate the antenna to point in a particular direction; when a user enters the *Dump Remote Base* command, a macro can be executed to disable the controller link paths and turn off the power to the remote base radio.

Select (Review) Remote Base Off Message

This message is sent over the repeater transmitter when the remote base is off.

- The Remote Base Off Message is sent when a User Function command has been executed and the remote base has not been enabled (see page 21-7).
- The message may be a combination of message types including CW, beeps, page tones, speech, etc.
- The maximum size of the message is 50 bytes (50 2-digit codes). You must count the control characters. Therefore, any message could have 46 CW characters, 23 synthesized speech words, etc.
- To delete a message, enter the password, the 4-digit root number, and the (*); do not enter any message.
- If this message is not programmed, the default CW message will be sent only when Command Responses are enabled.

Command Form:

Command	Form	Default
Select Remote Base Off Message	(PW) 31 60 (message) *	OFF in CW
Review Remote Base Off Message	(PW) 34 60 *	none

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: The default CW message is sent only if Command Responses are enabled.

Example:

To program the Remote Base Off Message to say “Remote Base Off”, enter the command:

```
(PW) 31 60 9960 0000 0418 0049 0355 *
```

Reset RBI-1

Perform a hardware reset of the *RBI-1* and the attached remote base radios.

- This command performs a reset of the *RBI-1* and attached remote base radios.
- The *RBI-1* Reset output (7K J3-16) is pulsed to hard-reset the *RBI-1*.
- After the Reset occurs, the previous radio settings are sent to the *RBI-1*.
- This command may take several seconds to complete.

Command Form:

Command	Form
Reset *RBI-1*	(PW) 39 91 *

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered

Default Condition: None.

Example:

To reset the *RBI-1* and attached radios, enter the following:

```
(PW) 39 91 *
```

Enable/Disable Access to the Remote Base

A flexible control scheme controls access to the remote base.

- Turns ON or OFF the remote base interface.
- Enter 1 digit: 0 for OFF (disabled), 1 for ON (enabled).
- Remote Base Enable #1 is intended to be used by the Control Operator as a master enable/disable of the remote base interface.
- Remote Base Enable #2 is intended to be used by the Time-of-Day Scheduler to control the times when the remote base interface may be used.
- Remote Base Enable #3 is intended to be used by the Control Operator to override the Time-of-Day Scheduler to activate the remote base interface at a time of day when the interface would be normally disabled.
- If the Time-of-Day Scheduler is not going to be utilized, only Remote Base Enable #1 needs to be manipulated by the Control Operator.
- Programmer's note: the remote base is enabled when the following equation evaluates to TRUE: EN1 AND (EN2 OR EN3).

Command Form:

Command	Form	Data Digit
Enable/Disable Remote Base Enable #1	(PW) 63 71 x *	0 = OFF (disabled) 1 = ON (enabled)
Enable/Disable Remote Base Enable #2	(PW) 63 72 x *	0 = OFF (disabled) 1 = ON (enabled)
Enable/Disable Remote Base Enable #3	(PW) 63 73 x *	0 = OFF (disabled) 1 = ON (enabled)

Acknowledgment: Sends OK

Errors:

Error	Meaning
? err 1	wrong number of digits entered

Default Condition: Enable #1 is OFF; Enable #2 is ON; Enable #3 is OFF.

Example:

The Control Operator can enable the remote base interface by entering:

```
(PW) 63 71 1 *
```

The Control Operator can disable the remote base interface by entering:

```
(PW) 63 71 0 *
```

To have the Scheduler control remote base access, define Scheduler setpoints to disable the remote base interface during afternoon drive times (4:00 P.M. through 6:30 P.M.) Monday through Friday. This requires macros to be executed by the Scheduler.

First, define macros containing the commands to enable and disable the remote base interface using Enable #2:

```
(PW) 20 9002 (PW) 63 72 0 * ; disable remote base
(PW) 20 9003 (PW) 63 72 1 * ; enable remote base
```

Then, define Scheduler setpoints to execute these macros:

```
(PW) 28 00 9002 99 32 16 00 * ; disable at 4 PM
(PW) 28 01 9003 99 32 18 30 * ; enable at 6:30 PM
```

User Functions: Controlling the Radios

Users will operate the remote base radios using the *User Functions* commands described on the following pages. These commands allow users to turn on and off the remote base interface, change VFO frequency or memory channel, transmitter offset and power, and change the operation of the CTCSS encoder and decoder.

Note: not all features are available in all remote base radios. See the *Doug Hall Electronics RBI-1 Manual* for availability of features in the radios that you are using.

As the *User Function* commands are entered, they are immediately sent to the *RBI-1* and on to the radio, with only a small processing delay.

Note: *User Function* commands are preceded by the *Remote Base Password* (shown as RBPW in the following pages) instead of the *Master Password* or *Control Operator Password* (shown as PW where required).

Normally, the remote base interface is off. When a user wants to use the remote base interface, he will enter the *User Function: Access Remote Base* command. This causes the *Remote Base Access-Triggered Macro* to be executed setting everything to initial settings that you defined.

The user can then specify a frequency or memory channel to monitor.

Direct Frequency Entry -- A user can directly enter a frequency to monitor or operate. The transmitter can be initially disabled or it can be enabled with an offset.

Radio Memory Channels -- A user can select a preprogrammed radio memory channel. The memory channels can contain the frequency, offset, and CTCSS information so that information does not need to be entered.

The user can change radio parameters as required to change frequency, transmit power, CTCSS frequency, etc.

When done with the remote base interface, the user would enter the *User Function: Dump Remote Base*. This causes the *Remote Base Dump-Triggered Macro* to be executed disabling the interface.

Defining Memory Channels using Macros

The macros of the *7K* controller can be used to predefine memory channels for easy selection of the most-used frequencies and radio configurations. Because macros can hold complicated controller commands, changing channels can be easily done using a short macro name.

The *User Function* commands described above cause each command to be sent to the *RBI-1* and remote base radio immediately. Since a macro can contain many radio commands, many data transfers may have to take place to setup the radio causing an unacceptable processing delay. The *Macro Function* commands are queued in controller memory until the *Macro Function: Send Queued Settings* command is executed. This causes all radio changes to be sent in only one data transfer for minimum processing delay.

Here is an example of defining a memory channel using a controller macro. The macro name we will define is 52. Let's say that you want the macro to select 146.520 MHz simplex, low power, and a CTCSS Frequency of 110.9 Hz. To define the macro, you would enter:

```
(PW) 20 0052 (RBPW) 21 146520 2 * ;Freq and Offset
(PW) 29 0052 (RBPW) 23 1 *        ;Tx Low Power
(PW) 29 0052 (RBPW) 27 15 *       ;CTCSS Frequency
(PW) 29 0052 (RBPW) 39 *          ;Send Queued Settings
; Pause, then say "Five-Two"
(PW) 29 0052 (PW) 15 9960 0000 0166 0538 *
```

To execute the macro, enter:

```
52 *
```

User Function: Access Remote Base

Access the remote base.

- Enter the *Remote Base Password* followed by a 1 and the star (*).
- Entering this command causes the *Remote Base Access-Triggered Macro* to be executed.
- Note: if no *Remote Base Access-Triggered Macro* has been assigned, this command will have no effect.

Command Form:

Command	Form
Access Remote Base	(RBPW) 1 *

Acknowledgment: Sends OK

Errors:

Error	Meaning
OFF	remote base is disabled
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: The remote base interface is initially off.

Example:

To access the remote base, enter the following

```
(RBPW) 1 *
```

User Function: Dump Remote Base

Dump the remote base.

- Enter the *Remote Base Password* followed by a 0 and the star (*).
- Entering this command causes the *Remote Base Dump-Triggered Macro* to be executed.
- Note: if no *Remote Base Dump-Triggered Macro* has been assigned, this command will have no effect.

Command Form:

Command	Form
Dump Remote Base	(RBPW) 0 *

Acknowledgment: Sends OK

Errors:

Error	Meaning
OFF	remote base is disabled
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: The remote base interface is initially off.

Example:

To dump the remote base, enter the following

```
(RBPW) 0 *
```

User Function: Speak Radio Configuration

Speak the current remote base radio configuration.

- The current radio settings can be spoken by the controller in one of several formats.
- Both abbreviated and detailed information is available.
- The controller will speak the Frequency or Memory Channel and whether the Transmitter is On or Off. If On, it will speak the Transmitter Offset.
- The controller will speak the CTCSS frequency and whether it is enabled for encode, decode, or both.

Command Form:

Command	Form
Speak Frequency and Offset	(RBPW) 19 *
Speak Frequency and Offset	(RBPW) 19 0 *
Speak CTCSS Frequency	(RBPW) 19 1 *
Speak All	(RBPW) 19 2 *
Speak Abbreviated Frequency and Offset	(RBPW) 19 3 *
Speak Abbreviated CTCSS Frequency	(RBPW) 19 4 *
Speak Abbreviated All	(RBPW) 19 5 *

Acknowledgment for Detailed Responses:

- When the VFO of the remote base radio is selected, the actual frequency is spoken.
- When a memory channel of the remote base radio is selected, the memory channel number is spoken.
- If the transmitter is disabled, the controller says “Transmit Off”.
- If the transmitter is enabled, the controller speaks the currently selected offset: “Offset Minus”, “No Offset”, or “Offset Plus”. Special offsets are supported. On the 1200 band, the controller may say “Offset Minus Twenty”. On the 440 band, the controller may say “Offset Minus Minus”. (See your radio manual for when this offset may be selected.)
- If no CTCSS tone is selected for encode or decode, the controller says “CTCSS Off”.
- If a tone is selected for either encode or decode, the controllers says “CTCSS” and the frequency. For example, for a CTCSS frequency of 123.0 Hz, it says “C T C S S one two three point zero hertz”.
- If a tone is selected for encode, the controller says “Transmit”.
- If a tone is selected for decode, the controller says “Receive”.
- If a tone is selected for encode and decode, the controller says “Transmit

And Receive".

Acknowledgment for Abbreviated Responses:

- When the VFO of the remote base radio is selected, an abbreviated version of the actual frequency is spoken. For example, "545" is spoken for "145.450" or "445.450".
- When a memory channel of the remote base radio is selected, the memory channel number is spoken.
- If the transmitter is enabled, the controller speaks the currently selected offset: "Minus" or "Plus" or nothing for simplex.
- If no CTCSS tone is selected for encode or decode, there is no response.
- If a tone is selected for either encode or decode, the controllers says just the CTCSS frequency. For example, for a CTCSS frequency of 123.0 Hz, "one two three zero" is spoken.

Errors:

Error	Meaning
OFF	remote base is disabled
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: None.

Examples:

To have the controller speak just the frequency and transmitter status of the remote base radio currently selected, enter the following:

```
(RBPW) 19 *
```

or:

```
(RBPW) 19 0 *
```

To verify the current CTCSS frequency and whether the radio is configured for encode or decode, enter:

```
(RBPW) 19 1 *
```

The hear the complete status of the radio, enter:

```
(RBPW) 19 2 *
```

The hear an abbreviated status of the radio, enter:

```
(RBPW) 19 5 *
```

User Function: Select Memory Channel and Band

Selects a specific remote base radio and memory channel.

- The *RBI-1* supports four bands: 144, 222, 440, and 1200.
- Memory channels range from 1 to the maximum number available in the selected radio.
- If the remote base radio was powered off, this command turns it on and enables the receiver.
- The remote base radio transmitter is disabled when this command is entered. To enable the transmitter, see the *User Function: Enable/Disable Transmitter* command.
- The CTCSS encoder and decoder frequency and enable/disable are set in the memory channel of the radio. If not set in the radio, they can be controlled by *User Function* commands.
- **Note:** this command only works on some of the radios that can be connected to the *RBI-1*. See the *RBI-1* manual for details.

Command Form:

Command	Form
Select A Memory Channel and Band	(RBPW) 40 (band) (channel) * *band* = 1 = 144 2 = 220 4 = 440 8 = 1200 *channel* = 1 thru the maximum supported by the radio
Macro: Select A Memory Channel and Band *(Stored until (RBPW) 39 sent.)*	(RBPW) 20 (band) (channel) *

Acknowledgment: Sends OK

Errors:

Error	Meaning
OFF	remote base is disabled
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: None.

Example:

To select memory channel 1 in the 144 MHz radio, enter the following

```
(RBPW) 40 1 1 *
```

To select memory channel 12 in the 440 MHz radio, enter the following

```
(RBPW) 40 4 12 *
```

User Function: Select VFO Frequency and Offset

Selects a specific remote base radio and enters a VFO frequency and offset.

- Enter the frequency that you want the receiver of the remote base radio to be set to.
- Optionally, enter the transmitter offset to be used. Transmitter offsets of minus, simplex, plus, and special offsets can be selected.
- If the remote base radio was powered off, this command turns it on and enables the receiver..
- If no transmitter offset is specified, the remote base transmitter is disabled. To set a transmitter offset and enable the transmitter, use the *User Function: Select Transmitter Offset* command.
- The CTCSS encoder and decoder are disabled.
- The transmitter power level remains at its previous setting.

Command Form:

Command	Form
Select VFO Frequency and Offset	(RBPW) 41 (frequency) (offset) * *frequency* = 140.000-149.995 MHz, 6 digits 220.000-229.995 MHz, 6 digits 420.000-449.995 MHz, 6 digits 1240.000-1299.995 MHz, 7 digits Note: the 1kHz digit can be only 5 or 0. The ranges are subject to the limitations of the radios in use. *offset* = 1 = Minus 2 = Simplex 3 = Plus 0 = Special: On 1200, Minus 20; On 420-440, special offset subject to limitations of radio in use.
Macro: Select VFO Frequency and Offset *(Stored until (RBPW) 39 sent.)*	(RBPW) 21 (frequency) (offset) *

Acknowledgment: Sends OK

Errors:

Error	Meaning
OFF	remote base is disabled
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: None.

Example:

To set the VFO frequency on the 440 MHz radio to 446.000 MHz with the transmitter disabled, enter the following

```
(RBPW) 41 446000 *
```

To set the VFO frequency on the 144 MHz radio to 146.940 MHz with a minus offset, enter the following

```
(RBPW) 41 146940 1 *
```

To set the VFO frequency on the 144 MHz radio to 146.520 MHz simplex, enter the following

```
(RBPW) 41 146520 2 *
```

User Function: Select Transmitter Offset

Selects a transmitter offset on the currently active remote base radio.

- Transmitter offsets of minus, simplex, plus, and special can be selected.
- This command has no effect when a memory channel is currently selected.
- If the remote base radio transmitter is disabled, it will be enabled.

Command Form:

Command	Form
Select Transmitter Offset	(RBPW) 42 (offset) * *offset* = 1 = Minus 2 = Simplex 3 = Plus 0 = Special: On 1200, Minus 20; On 420-440, special offset subject to limitations of radio in use.
Macro: Select Transmitter Offset *(Stored until (RBPW) 39 sent.)*	(RBPW) 22 (offset) *

Acknowledgment: Sends OK

Errors:

Error	Meaning
OFF	remote base is disabled
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: The remote base interface is initially off.

Example:

To enable the transmitter and set the transmitter offset on the currently selected radio to minus, enter the following:

```
(RBPW) 42 1 *
```

To enable the transmitter and set the transmitter offset on the currently selected radio to simplex, enter the following:

```
(RBPW) 42 2 *
```

User Function: Enable/Disable Transmitter

Enables or disables the transmitter on the currently active remote base radio.

- The transmitter can be enabled or disabled.

Command Form:

Command	Form
Enable/Disable Transmitter	(RBPW) 45 x * 0 = OFF (disable) 1 = ON (enable)
Macro: Select Enable/Disable Transmitter *(Stored until (RBPW) 39 sent.)*	(RBPW) 25 x *

Acknowledgment: Sends OK

Errors:

Error	Meaning
OFF	remote base is disabled
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: The transmitter is disabled when the *Select VFO Frequency and Offset* is entered without an offset. The transmitter is disabled when a memory channel is selected.

Example:

To enable the transmitter, enter the following:

```
(RBPW) 45 1 *
```

To disable the transmitter, enter the following:

```
(RBPW) 45 0 *
```

User Function: Enable/Disable Receiver

Enables or disables the receiver on the currently active remote base radio.

- The receiver can be enabled or disabled.

Command Form:

Command	Form
Enable/Disable Receiver	(RBPW) 44 x * 0 = OFF (disable) 1 = ON (enable)
Macro: Select Enable/Disable Receiver *(Stored until (RBPW) 39 sent.)*	(RBPW) 24 x *

Acknowledgment: Sends OK

Errors:

Error	Meaning
OFF	remote base is disabled
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: The receiver is enabled when a VFO frequency or memory channel is selected.

Example:

To enable the receiver, enter the following:

```
(RBPW) 44 1 *
```

To disable the receiver, enter the following:

```
(RBPW) 44 0 *
```

User Function: Enable/Disable Radio Power

Enables or disables the power to the currently active remote base radio.

- The radio power can be enabled or disabled.
- **Note:** not all radios that can be connected to the *RBI-1* can have their power controlled. See the *RBI-1* manual for details.

Command Form:

Command	Form
Enable/Disable Radio Power	(RBPW) 46 x * 0 = OFF (disable) 1 = ON (enable)
Macro: Select Enable/Disable Radio Power *(Stored until (RBPW) 39 sent.)*	(RBPW) 26 x *

Acknowledgment: Sends OK

Errors:

Error	Meaning
OFF	remote base is disabled
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: Radio power is enabled when a VFO frequency or memory channel is selected.

Example:

To turn the power on to the selected radio, enter the following:

```
(RBPW) 46 1 *
```

To turn the power off to the selected radio, enter the following:

```
(RBPW) 46 0 *
```

User Function: Select Transmitter Power Output

Selects the transmitter power output level of the currently active remote base radio.

- The transmitter power output level can be set to low, medium, or high.
- **Note:** not all radios that can be connected to the *RBI-1* can have their transmitter power output level controlled. See the *RBI-1* manual for details.

Command Form:

Command	Form
Select Transmitter Power Output	(RBPW) 43 x * 1 = Low 2 = Medium 3 = High
Macro: Select Transmitter Power Output *(Stored until (RBPW) 39 sent.)*	(RBPW) 23 x *

Acknowledgment: Sends OK

Errors:

Error	Meaning
OFF	remote base is disabled
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: The current transmitter power output level is the power output level that was last set. (The controller does not change the level in response to any other commands.)

Example:

To set the transmitter power output level on the currently selected radio to medium, enter the following:

```
(RBPW) 43 2 *
```

User Function: Select Frequency of CTCSS

Selects the frequency of the CTCSS Encoder and Decoder of the currently active remote base radio.

- The CTCSS frequency is entered as a *Tone Code* that is looked up in a table. See page 10-5 for frequencies from 67.0 through 203.5.
- Entering this command causes the CTCSS Encoder to be enabled and the CTCSS Decoder to be disabled.
- This command has no effect if a memory channel of the currently active radio is selected and the memory channel sets the CTCSS frequency.
- **Note:** not all radios that can be connected to the *RBI-1* can have their CTCSS frequency controlled. See the *RBI-1* manual for details.

Command Form:

Command	Form
Select CTCSS Frequency	(RBPW) 47 (tone code) * *tone code* = (01-32, see page 10-5) 33 = 210.7 Hz 34 = 218.1 Hz 35 = 225.7 Hz 36 = 233.6 Hz 37 = 241.8 Hz 38 = 250.3 Hz
Macro: Select CTCSS Frequency *(Stored until (RBPW) 39 sent.)*	(RBPW) 27 (tone code) *

Acknowledgment: Sends OK

Errors:

Error	Meaning
OFF	remote base is disabled
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: None.

Example:

To set the CTCSS frequency to 82.5 Hz, lookup the *Tone Code* in the *TS-32 Programming Table* on page 10-5 and enter the following:

```
(RBPW) 47 6 *
```

To set the CTCSS frequency to 110.9 Hz, enter the following:

```
(RBPW) 47 15 *
```

User Function: Enable/Disable CTCSS Encoder

Enables or disables the CTCSS Encoder on the currently active remote base radio.

- The CTCSS Encoder can be enabled or disabled.
- This command has no effect if a memory channel of the currently active radio is selected and the memory channel enables the CTCSS Encoder.

Command Form:

Command	Form
Enable/Disable CTCSS Encoder	(RBPW) 48 x * 0 = OFF (disable) 1 = ON (enable)
Macro: Select Enable/Disable CTCSS Encoder *(Stored until (RBPW) 39 sent.)*	(RBPW) 28 x *

Acknowledgment: Sends OK

Errors:

Error	Meaning
OFF	remote base is disabled
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: The CTCSS Encoder is enabled when a CTCSS frequency is selected. The CTCSS Encoder is disabled when a VFO frequency is selected.

Example:

To enable the CTCSS Encoder in the selected radio, enter the following:

```
(RBPW) 48 1 *
```

To disable the CTCSS Encoder in the selected radio, enter the following:

```
(RBPW) 48 0 *
```

User Function: Enable/Disable CTCSS Decoder

Enables or disables the CTCSS Decoder on the currently active remote base radio.

- The CTCSS Decoder can be enabled or disabled.
- This command has no effect if a memory channel of the currently active radio is selected and the memory channel enables the CTCSS Encoder or Decoder.

Command Form:

Command	Form
Enable/Disable CTCSS Decoder	(RBPW) 49 x * 0 = OFF (disable) 1 = ON (enable)
Macro: Select Enable/Disable CTCSS Decoder *(Stored until (RBPW) 39 sent.)*	(RBPW) 29 x *

Acknowledgment: Sends OK

Errors:

Error	Meaning
OFF	remote base is disabled
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: The CTCSS Decoder is disabled when a CTCSS frequency is selected. The CTCSS Decoder is also disabled when a VFO frequency is selected.

Example:

To enable the CTCSS Decoder in the selected radio, enter the following:

```
(RBPW) 49 1 *
```

To disable the CTCSS Decoder in the selected radio, enter the following:

```
(RBPW) 49 0 *
```

Macro Function: Send Queued Settings

Transfers the queued *Macro* settings to the remote base radio.

- The settings entered from the *Macro* commands are stored in the controller memory until this command is executed.
- Settings are queued using *Macro* commands 20-29.

Command Form:

Command	Form
Send Queued Settings	(RBPW) 39 *

Acknowledgment: Sends OK

Errors:

Error	Meaning
OFF	remote base is disabled
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: None.

Example:

To send the queued settings stored in the controller memory to the remote base radio, enter the following:

```
(RBPW) 39 *
```

RBI-1 User Function Outputs

The eight *RBI-1 User Function Outputs* are available for your use in operating auxiliary devices at the repeater site. These outputs can be latched ON or OFF. The outputs can be controlled individually or as a group.

"ON" refers to the state of an output when it is sinking current to ground; "OFF" refers to the state of an output when it is open (floating).

Following a power failure or controller reset, the outputs are set to the state that they were before the power failure or reset.

A number of the *User Function Outputs* can be grouped for control using decimal numbers from 0 to 255. This type of command could be used to enter rotator azimuths for control of an antenna rotator. Since not all outputs may need to be used for rotator control, the number of outputs can be specified so that the remaining outputs can be used for control of other auxiliary devices.

Here is an example of the use of the *User Function Outputs*. Suppose you needed to control a rotator that needed six control lines to specify the azimuth in which to point the antenna. You would connect the rotator controller to the *User Function Outputs* starting from *UF-1* as follows:

***RBI-1* Pin**	**Function**	***RBI-1* Pin**	**Function**
UF-1	Rotator Control Line #0	UF-4	Rotator Control Line #3
UF-2	Rotator Control Line #1	UF-5	Rotator Control Line #4
UF-3	Rotator Control Line #2	UF-6	Rotator Control Line #5

You would then issue the *Select RBI-1 Number of User Function Outputs* command:

```
(PW) 39 90 6 *
```

to specify that only the first six *User Function Outputs* are to be controlled by the *Enter RBI-1 User Function Output Group.* The rotator would then be controlled by entering values in the range of zero (0) through sixty-three (63).

The remaining *User Function Outputs*, seven and eight, would be available for auxiliary control.

The range of decimal numbers that may be entered in the group depends on the number of *User Function Outputs* included in the group. The following table defines the ranges. The group always starts with *UF-1*:

Group	**Valid Decimal Numbers**	**Group**	**Valid Decimal Numbers**
0	none available	5	0 thru 31
1	0 or 1	6	0 thru 63
2	0 thru 3	7	0 thru 127
3	0 thru 7	8	0 thru 255
4	0 thru 15		

Select *RBI-1* Number of User Function Outputs

Selects the number of *RBI-1* User Function Outputs to be included in the group.

- Enter a number from 0 to 8 to define how many outputs are to be controlled as a group.
- The group always starts at *UF-1*.
- Programmer's note: *UF-8* is the Most Significant Bit (MSB); *UF-1* is the Least Significant Bit (LSB).

Command Form:

Command	Form
Select *RBI-1* Number of User Function Outputs	(PW) 39 90 (number of outputs) *

Acknowledgment: Sends OK

Errors:

Error	Meaning
OFF	remote base is disabled
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: All 8 outputs are included in the group.

Example:

To set the number of outputs in the group to 6, enter the following:

```
(PW) 39 90 6 *
```

Select Individual *RBI-1* User Function Outputs

Control one or more *RBI-1* User Function Outputs.

- Each output in a list of outputs may be latched ON or OFF.
- List the outputs to be controlled by entering any combination of digits 1 through 8.

Command Form:

Command	Form
Select User Function Outputs Latched OFF	(RBPW) 12 (list the outputs) *
Select User Function Outputs Latched ON	(RBPW) 11 (list the outputs) *

Acknowledgment: Sends OK

Errors:

Error	Meaning
OFF	remote base is disabled
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: After a 7K cold reset, the outputs are off. After a power failure, the outputs will be set to the state they were in before the power failure.

Example:

To turn ON user function output 1, enter the following:

```
(RBPW) 11 1 *
```

To turn OFF user function output 2, enter the following:

```
(RBPW) 12 2 *
```

To turn ON user function outputs 7 and 8, enter the following:

```
(RBPW) 11 7 8 *
```

Enter *RBI-1* User Function Output Group

Control a group of *RBI-1* User Function Outputs.

- Enter a decimal number to control a group of outputs.
- The largest decimal number is determined by the number of outputs selected by the *Select Number Of User Function Outputs* command
- Programmer's Note: *UF-8* is the Most Significant Bit (MSB); *UF-1* is the Least Significant Bit (LSB).

Command Form:

Command	Form
Select User Function Output Group	(RBPW) 10 (decimal number) * *decimal number =* *(See table on page 26.)*

Acknowledgment: Sends OK

Errors:

Error	Meaning
OFF	remote base is disabled
? err 1	wrong number of digits entered
? err 2	illegal digit entered

Default Condition: After a 7K cold reset, the outputs are off. After a power failure, the outputs will be set to the state they were in before the power failure.

Example:

To output a value of 30 to the group of outputs, enter the following:

```
(RBPW) 10 30 *
```

Command Quick Reference

Page	Command Name	Form and Data Digit	Default	User
4-1	**Messages**			
4-10	Enable/Disable CW	(PW) 63 01 x * 0 = OFF (disabled) 1 = ON (enabled)	ON enabled	
4-11	Select Frequency of CW	(PW) 06 00 (tone code) * *See Tone Code Table on page A-20.*	1500 Hz	
4-12	Send Next CW Message Slowly	(PW) 11 *	normal rate	
4-13	Select Normal CW Speed	(PW) 12 x * 0 = 5 WPM 5 = 17 WPM 1 = 7 WPM 6 = 20 WPM 2 = 10 WPM 7 = 24 WPM 3 = 13 WPM 8 = 30 WPM 4 = 15 WPM 9 = 40 WPM	20 WPM	
4-13	Select Slow CW Speed	(PW) 13 x * 0 = 5 WPM 5 = 17 WPM 1 = 7 WPM 6 = 20 WPM 2 = 10 WPM 7 = 24 WPM 3 = 13 WPM 8 = 30 WPM 4 = 15 WPM 9 = 40 WPM	15 WPM	
4-18	Select Frequency of Beep 48	(PW) 06 01 (tone code) * *See Tone Code Table on page A-20.*	500 Hz	
4-18	Select Frequency of Beep 49	(PW) 06 02 (tone code) * *See Tone Code Table on page A-20.*	750 Hz	
4-18	Select Frequency of Beep 50	(PW) 06 03 (tone code) * *See Tone Code Table on page A-20.*	1000 Hz	
4-18	Select Frequency of Beep 51	(PW) 06 04 (tone code) * *See Tone Code Table on page A-20.*	1250 Hz	
4-18	Select Frequency of Beep 52	(PW) 06 05 (tone code) * *See Tone Code Table on page A-20.*	1500 Hz	
4-18	Select Frequency of Beep 53	(PW) 06 06 (tone code) * *See Tone Code Table on page A-20.*	1750 Hz	
4-35	Select Courtesy Message	(PW) 31 10 (message) *	60 mS 440 Hz beep (74 09)	
4-35	Select Dropout Message	(PW) 31 13 (message) *	none	
4-35	Select Pre-Timeout Message	(PW) 31 16 (message) *	TO in CW	
4-35	Select Post-Timeout Message	(PW) 31 19 (message) *	TO in CW	
4-35	Select Initial ID Message for Tx1	(PW) 31 30 (message) *	ID in CW	
4-35	Select Initial ID Message for Tx2	(PW) 31 33 (message) *	9983 ID in CW	
4-35	Select Normal ID Message for Tx1	(PW) 31 31 (message) *	ID in CW	
4-35	Select Normal ID Message for Tx2	(PW) 31 34 (message) *	9983 ID in CW	

Command Quick Reference

Page	Command Name	Form and Data Digit	Default	User
4-35	Select Autopatch Dialing Message	(PW) 31 40 (message) *	AS in CW	
4-35	Select Autopatch Timeout Warning Message	(PW) 31 41 (message) *	AR in CW	
4-35	Select Phone Line Answer Message	(PW) 31 50 (message) *	3 beeps (74 09 21 33)	
4-35	Select Reverse Patch Ringout Message	(PW) 31 51 (message) *	55 in CW	
4-38	Review Courtesy Message	(PW) 34 10 (message) *	none	
4-38	Review Dropout Message	(PW) 34 13 (message) *	none	
4-38	Review Pre-Timeout Message	(PW) 34 16 (message) *	none	
4-38	Review Post-Timeout Message	(PW) 34 19 (message) *	none	
4-38	Review Initial ID Message for Tx1	(PW) 34 30 (message) *	none	
4-38	Review Initial ID Message for Tx2	(PW) 34 33 (message) *	9983 ID in CW	
4-38	Review Normal ID Message for Tx1	(PW) 34 31 (message) *	none	
4-38	Review Normal ID Message for Tx2	(PW) 34 34 (message) *	9983 ID in CW	
4-38	Review Autopatch Dialing Message	(PW) 34 40 (message) *	AS in CW	
4-38	Review Autopatch Timeout Warning Message	(PW) 34 41 (message) *	none	
4-38	Review Phone Line Answer Message	(PW) 34 50 (message) *	none	
4-38	Review Reverse Patch Ringout Message	(PW) 34 51 (message) *	none	
4-39	Send Message	(PW) 15 (message) *	none	
5-1	**Security**			
5-2	Assign Control Operator Password	(PW) 92 (new control operator PW) *	no password	
5-3	Assign Master Password	(PW) 93 (new master PW) *	99	
5-4	Assign Control Operator Privilege Level	(PW) 94 (root number, x) * 0 = master and control operator 1 = master only	all commands accessible	
5-5	Assign Control Operator Privilege Level to a Range of Commands	(PW) 94 (first root number, last root number, x) * 0 = master and control operator 1 = master only	all commands accessible	
6-1	**Macros**			
6-5	Create New Macro	(PW) 20 (macro name, command) *	no macros	
6-7	Append to Macro	(PW) 29 (macro name, command) *	none	
6-9	List Macro in CW	(PW) 33 (macro name) *	none	
6-17	List Macro in Speech	(PW) 35 (macro name) *	none	
6-10	Erase Macro	(PW) 21 (macro name) *	none	
6-11	Erase All Macros	(PW) 22 00 *	none	
6-12	Rename Macro	(PW) 27 (old, new) *	none	
6-14	Pause	(PW) 98 xxx *	none	

Command Quick Reference

Page	Command Name	Form and Data Digit	Default	User
		(1-255) seconds		
6-15	Select Power ON-Triggered Macro	(PW) 26 00 (macro name) *	none	
7-3	**Autopatch Setup and Configuration**			
7-5	Select Autopatch Dialing Mode	(PW) 61 x * 1 = 10 PPS rotary 2 = 20 PPS rotary 3 = 5 PPS DTMF	10 PPS rotary	
7-6	Select Autopatch Dialing Message	(PW) 31 40 (message) *	AS in CW	
7-6	Review Autopatch Dialing Message	(PW) 34 40 *	AS in CW	
7-7	Enable/Disable Autopatch Dialing Mixed-Mode	(PW) 63 04 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled	
7-8	Enable/Disable Pound Down (# Dump)	(PW) 63 05 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled	
7-9	Dump Autopatch Using A Code	(PW) 83 *	none	
7-10	Select Autopatch Access-Triggered Macro	(PW) 26 12 (macro name) *	none	
7-10	Select Autopatch Dump-Triggered Macro	(PW) 26 13 (macro name) *	none	
7-11	Enable/Disable Full-Duplex Mode	(PW) 63 07 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled	
7-12	Enable/Disable Autopatch Privacy	(PW) 63 06 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled	
7-13	Enable/Disable Repeater-to-Phone DTMF Mute	(PW) 63 08 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled	
7-51	Select Landline Busy Message	(PW) 31 42 (message) *	BZ in CW	
7-51	Select Autopatch Off Message	(PW) 31 44 (message) *	OFF in CW	
7-51	Select Autopatch Error Message (Invalid phone number)	(PW) 31 45 (message) *	?ERR in CW	
7-51	Select Autopatch Reject Message (Match in Reject Table)	(PW) 31 46 (message) *	?REJ in CW	
7-51	Select Autopatch No-Redial-Number Message	(PW) 31 47 (message) *	CLR in CW	
7-51	Review Autopatch Error Message	(PW) 34 45 *	?ERR in CW	
7-51	Review Autopatch No-Redial-Number Message	(PW) 34 47 *	CLR in CW	
7-51	Review Autopatch Off Message	(PW) 34 44 *	OFF in CW	
7-51	Review Autopatch Reject Message	(PW) 34 46 *	?REJ in CW	
7-51	Review Landline Busy Message	(PW) 34 42 *	BZ in CW	
7-52	Select Autopatch Dump Message	(PW) 31 43 (message) *	none	
7-52	Review Autopatch Dump Message	(PW) 34 43 *	none	

Command Quick Reference

Page	Command Name	Form and Data Digit	Default	User
7-53	Autopatch Pause (“B”) Digit Time (Note: does **not** affect the pause in an Autopatch Dialing Prefix.)	(PW) 49 96 xxx * (001-100)=0.1-10.0 seconds 010 = 1.0 seconds 020 = 2.0 seconds 100 = 10.0 seconds	5.0 seconds	
7-54	Landline Hookflash	(PW) 83 1 *	none	
7-55	Autopatch Go Off-Hook	(PW) 83 2 *	none	
7-55	Autopatch Go Off-Hook, Ignore Busy Logic Input	(PW) 83 3 *	none	
7-56	Select Autopatch Dialing Prefix	(PW) 83 10 (prefix) * Up to 16-digits. 00=0, 01=1, 02=2, 03=3, 04=4, 05=5, 06=6, 07=7, 08=8, 09=9, 10=A, 11=B, 12=C, 13=D, 14=*, 15=#, 16=1-Second Pause, 17=2-Second Pause, 18=5-Second Pause, 19 = 10-Second Pause, 20=Rotary, 21=DTMF	none	
7-56	Delete Autopatch Dialing Prefix	(PW) 83 10 *	none	
7-58	Enable/Disable ID During Autopatch	(PW) 63 09 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled	
7-59	Require Dump Before Next Call	(PW) 63 10 x * 0 = OFF (not required) 1 = ON (required)	OFF not required	
7-14	**Autopatch Timeout Timer**			
7-15	Select Autopatch Timeout Timer	(PW) 65 xxx * (000-546) = 0.0-54.6 minutes 000 = infinity 001 = 0.1 minute 030 = 3.0 minutes 546 = 54.6 minutes ... etc.	3.0 minutes	
7-16	Reset Autopatch Timeout Timer	(PW) 81 *	none	
7-17	Select Autopatch Timeout Warning Message	(PW) 31 41 (message) *	AR in CW	
7-17	Review Autopatch Timeout Warning Message	(PW) 34 41 *	none	
7-18	**Autopatch Access and Passwords**			
7-19	Access Autopatch With Password	(AP access pswd) (phone number) *	PW is 10	
7-20	Access Autopatch Without Password	(phone number) *	OFF (disabled)	
7-22	Change Autopatch Access Password	(PW) 23 (new AP access password) *	PW is 10	
7-23	Enable/Disable Autopatch Access Without Password	(PW) 63 11 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled	

Command Quick Reference

Page	Command Name	Form and Data Digit	Default	User
7-24	**Autopatch Call Types**			
7-60	Select Autopatch Call Types	(PW) 60 x * none = OFF (disabled) 0 = accepted numbers only 1 = operator (0) 2 = xxx-xxxx 3 = 0-xxx-xxxx 4 = 1-xxx-xxxx 5 = 0-xxx-xxx-xxxx 6 = 1-xxx-xxx-xxxx 7 = 1-800-xxx-xxxx, 1-888-xxx-xxxx 8 = xxx-xxx-xxxx	OFF disabled	
7-27	**Autopatch Restrictions**			
7-28	Clear All Accepted Numbers From Table	(PW) 68 *	table empty	
7-28	Enter Accepted Number Into Table	(PW) 68 (phone number) *	table empty	
7-30	Clear All Rejected Numbers From Table	(PW) 67 *	table empty	
7-30	Enter Rejected Number Into Table	(PW) 67 (phone number) *	table empty	
7-32	**Autopatch Redialer**			
7-33	Redial Last Number	(PW) 84 *	memory cleared	
7-34	Clear Autopatch Redialer	(PW) 85 *	memory cleared	
7-35	**Autopatch Call Counter**			
7-36	Clear Autopatch Call Counter	(PW) 69 *	counter 000	
7-37	Send Autopatch Call Count in CW	(PW) 86 *	counter 000	
A-44	Send Autopatch Call Count in Speech	(PW) 15 9897 *	counter 000	
7-38	**Phone Line Control Mode**			
7-41	Select Phone Line Answer Mode, Do Not Answer	(PW) 64 0 *	*(see next command)*	
7-41	Select Phone Line Answer Mode	(PW) 64 x yy zz * x = *mode* (1-4) (*See page 7-38*) y = *ring-in delay* (00-99) rings z = *ringout limit* (00-99) rings	mode 3, ring-in delay 2, ringout limit 1	
7-42	Select Phone Line Answer Message	(PW) 31 50 (message) *	3 beeps (74 09 21 33)	
7-42	Review Phone Line Answer Message	(PW) 34 50 *	none	

Command Quick Reference

Page	Command Name	Form and Data Digit	Default	User
7-43	Select Phone Line Answer Macro	(PW) 26 16 (macro name) *	none	
7-44	Select Phone Line Off-Hook Timer	(PW) 79 xxx * (000-546)=0.1-54.6 minutes 000 = infinity 001 = 0.1 minute 030 = 3.0 minutes 546 = 54.6 minutes ... etc.	none	
7-45	Monitor Repeater Receiver (Rx1)	(PW) 63 23 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled	
7-45	Monitor Repeater Receiver (Rx1) and Talk Out Tx1	(PW) 63 26 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled	
7-62	Select Control Mode Dump-Triggered Macro	(PW) 26 81 (macro name) *	none	
7-46	**Reverse Patch**			
7-47	Trigger Reverse Patch	(PW) 87 *	none	
7-48	Answer Reverse Patch	(PW) 88 *	none	
7-49	Select Reverse Patch Ringout Message	(PW) 31 51 (message) *	55 in CW	
7-49	Review Reverse Patch Ringout Message	(PW) 34 51 *	none	
7-63	Select Ring-Triggered Macro	(PW) 26 80 (macro name) * Note: executes on each ring.	none	
8-1	**Clock and Calendar**			
8-2	Set Clock and Calendar	(PW) 25 (year, month, day-of-month, day-of-week, hour, minute) * year = 00-99 month = 01-12 (Jan is 01) day-of-month = 01-31 day-of-week = 0-6 (Sun is 0) hour = 00-23 minute = 00-59	00:00:00, Wed, Jan 1, 1992	
8-4	Adjust Daylight Savings Time	(PW) 48 x * 0 = *fall back* (subtract 1 from hours) 1 = *spring ahead* (add 1 to hours) 2 = *fall back* (subtract 1 from hours, inhibited for 61 minutes.)	none	
8-6	Reset Clock Seconds	(PW) 48 3 *	none	
8-7	Add Clock Seconds	(PW) 48 4 (seconds) * seconds = 01-30	none	
8-7	Subtract Clock Seconds	(PW) 48 5 (seconds) * seconds = 01-30	none	
8-7	Subtract Clock Seconds, Inhibited for 2 Minutes	(PW) 48 6 (seconds) * seconds = 01-30 (Inhibited for 2 minutes)	none	

Command Quick Reference

Page	Command Name	Form and Data Digit	Default	User
9-1	**Scheduler**			
9-2	Create Setpoint	(PW) 28 (setpoint, macro, month, day, hour, minute) * setpoint = 00-99, 2 digits macro = 4 digits month = 01-12 or 99, 2 digits day = 01-75 or 99, 2 digits *(See Day Code Table page A-46.)* hour = 00-23 or 99, 2 digits minute = 00-59 or 99, 2 digits (Note: 99 is the *wild card*)	no setpoints	
9-2	Delete One Setpoint	(PW) 28 (setpoint) * setpoint = 00-99, 2 digits	none	
9-7	Delete Range of Setpoints	(PW) 28 (first setpoint) (last setpoint) * setpoint = 00-99, 2 digits	none	
9-8	Enable/Disable Scheduler	(PW) 63 15 x * 0 = OFF (disabled) 1 = ON (enabled)	ON enabled	
10-1	**CTCSS Functions**			
10-2	Enable/Disable CTCSS Encoder	(PW) 02 x * 0 = disabled 5 = 5 seconds 1 = continuous 6 = 6 seconds 2 = 2 seconds 7 = 7 seconds 3 = 3 seconds 8 = 8 seconds 4 = 4 seconds 9 = 9 seconds	0 disabled	
10-3	Select Frequency of CTCSS	(PW) 03 xx * (00-63) *See TS-32 Programming, page 10-5.*	all outputs open	
11-1	**DTMF Decoder**			
11-2	Enable/Disable Command Response Messages	(PW) 63 02 x * 0 = OFF (disabled) 1 = ON (enabled)	ON enabled	
11-3	Select DTMF Priority/Scan	(PW) 89 (Rx1, Rx2, Rx3, PH) * 0 = no access to DTMF decoder 1 = Priority 1 (highest priority) 2 = Priority 2 3 = Priority 3 4 = Priority 4 5 = Scan this device	Priorities: Rx1 = 3 Rx2 = 4 Rx3 = 1 PH = 2	
11-13	Select Rx1-to-DTMF Decoder Access Mode	(PW) 57 06 x * 0 = no access 1 = carrier access 2 = PL access 3 = And-PL access 4 = Or-PL access 5 = Anti-PL access	1 carrier access	
11-13	Select Rx2-to-DTMF Decoder Access Mode	(PW) 57 07 x * Same as above	1 carrier access	

Command Quick Reference

Page	Command Name	Form and Data Digit	Default	User
11-13	Select Rx3-to-DTMF Decoder Access Mode	(PW) 57 08 x * Same as above	1 carrier access	
11-7	Select DTMF Decoder Interdigit Timer	(PW) 82 xx * (01-99) = 0.1-9.9 seconds 01 = 0.1 seconds 05 = 0.5 seconds 10 = 1.0 seconds 99 = 9.9 seconds ... etc.	5.0 seconds	
11-8	Select DTMF Decoder Mute Delay	(PW) 96 x * (0-9) = 0.0-0.9 seconds 0 = 0 seconds 1 = 0.1 seconds 2 = 0.2 seconds ... etc.	0.5 seconds	
11-9	Enable/Disable Rx1-Tx1 DTMF Mute	(PW) 63 50 x * 0 = OFF (disabled) 1 = ON (enabled)	ON enabled	
11-9	Enable/Disable Rx2-Tx1 DTMF Mute	(PW) 63 51 x * 0 = OFF (disabled) 1 = ON (enabled)	ON enabled	
11-9	Enable/Disable Rx3-Tx1 DTMF Mute	(PW) 63 52 x * 0 = OFF (disabled) 1 = ON (enabled)	ON enabled	
11-9	Enable/Disable Rx1-Tx2 DTMF Mute	(PW) 63 53 x * 0 = OFF (disabled) 1 = ON (enabled)	ON enabled	
11-9	Enable/Disable Rx2-Tx2 DTMF Mute	(PW) 63 54 x * 0 = OFF (disabled) 1 = ON (enabled)	ON enabled	
11-9	Enable/Disable Rx3-Tx2 DTMF Mute	(PW) 63 55 x * 0 = OFF (disabled) 1 = ON (enabled)	ON enabled	
11-10	Enable/Disable DTMF Long Tones	(PW) 63 68 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled	
11-11	Assign Macro to Long Tone Zero	(PW) 26 50 (macro name) *	none	
11-11	Assign Macro to Long Tone One	(PW) 26 51 (macro name) *	none	
11-11	Assign Macro to Long Tone Two	(PW) 26 52 (macro name) *	none	
11-11	Assign Macro to Long Tone Three	(PW) 26 53 (macro name) *	none	
11-11	Assign Macro to Long Tone Four	(PW) 26 54 (macro name) *	none	
11-11	Assign Macro to Long Tone Five	(PW) 26 55 (macro name) *	none	
11-11	Assign Macro to Long Tone Six	(PW) 26 56 (macro name) *	none	
11-11	Assign Macro to Long Tone Seven	(PW) 26 57 (macro name) *	none	
11-11	Assign Macro to Long Tone Eight	(PW) 26 58 (macro name) *	none	
11-11	Assign Macro to Long Tone Nine	(PW) 26 59 (macro name) *	none	
11-11	Assign Macro to Long Tone A	(PW) 26 60 (macro name) *	none	
11-11	Assign Macro to Long Tone B	(PW) 26 61 (macro name) *	none	
11-11	Assign Macro to Long Tone C	(PW) 26 62 (macro name) *	none	

Command Quick Reference

Page	Command Name	Form and Data Digit	Default	User
11-11	Assign Macro to Long Tone D	(PW) 26 63 (macro name) *	none	
11-11	Assign Macro to Long Tone Star (*)	(PW) 26 64 (macro name) *	none	
11-11	Assign Macro to Long Tone Pound (#)	(PW) 26 65 (macro name) *	none	
12-1	**Identifier**			
12-9	Select Initial ID Message for Tx1	(PW) 31 30 (message) *	ID in CW	
12-9	Select Initial ID Message for Tx2	(PW) 31 33 (message) *	9983 ID in CW	
12-9	Select Normal ID Message for Tx1	(PW) 31 31 (message) *	ID in CW	
12-9	Select Normal ID Message for Tx2	(PW) 31 34 (message) *	9983 ID in CW	
12-9	Select Impolite ID Message for Tx1	(PW) 31 32 (message) *	none	
12-9	Select Impolite ID Message for Tx2	(PW) 31 35 (message) *	none	
12-9	Review Initial ID Message for Tx1	(PW) 34 30 *	none	
12-9	Review Initial ID Message for Tx2	(PW) 34 33 *	none	
12-9	Review Normal ID Message for Tx1	(PW) 34 31 *	none	
12-9	Review Normal ID Message for Tx2	(PW) 34 34 *	none	
12-9	Review Impolite ID Message for Tx1	(PW) 34 32 *	none	
12-9	Review Impolite ID Message for Tx2	(PW) 34 35 *	none	
12-4	Select Impolite ID Macro for Tx1	(PW) 26 05 (macro name) *	none	
12-4	Select Impolite ID Macro for Tx2	(PW) 26 48 (macro name) *	none	
12-4	Select Initial ID Macro for Tx1	(PW) 26 03 (macro name) *	none	
12-4	Select Initial ID Macro for Tx2	(PW) 26 46 (macro name) *	none	
12-4	Select Polite ID Macro for Tx1	(PW) 26 04 (macro name) *	none	
12-4	Select Polite ID Macro for Tx2	(PW) 26 47 (macro name) *	none	
12-5	Select ID Message Interval for Tx1 and Tx2	(PW) 51 xxx * (005-300) = 0.5-30.0 minutes 005 = 0.5 minutes 060 = 6.0 minute 099 = 9.9 minutes 300 = 30.0 minutes ... etc.	3.0 minutes	
12-13	Select ID Pending Interval for Tx1 and Tx2	(PW) 49 97 xxxx * (0300-1800) = 30.0-180.0 seconds 0300 = 30.0 seconds 0600 = 60.0 seconds 1200 = 120.0 seconds 1800 = 180.0 seconds ... etc.	30.0 seconds	
12-6	Reset Initial ID Message to Normal ID Message for Tx1	(PW) 54 *	none	
12-7	Send Initial ID Message for Tx1	(PW) 55 *	none	

Command Quick Reference

Page	Command Name	Form and Data Digit	Default	User
12-11	Select Initial ID Tail Message for Tx1	(PW) 50 0 xx * xx = tail number 0-15 and 98 0 = (none) 9 = WARN 1 = FEST 10 = RACES 2 = DUES 11 = TGIF 3 = MEET 12 = /R 4 = NET 13 = LINK 5 = HI 14 = RMT (remote) 6 = WX 15 = BAT 7 = ALERT 98 = programmable 8 = WATCH (none) = no msg	none	
12-11	Select Normal ID Tail Message for Tx1	(PW) 50 1 xx * xx = tail number 0-15 and 98 0 = (none) 9 = WARN 1 = FEST 10 = RACES 2 = DUES 11 = TGIF 3 = MEET 12 = /R 4 = NET 13 = LINK 5 = HI 14 = RMT (remote) 6 = WX 15 = BAT 7 = ALERT 98 = programmable 8 = WATCH (none) = no msg	none	
12-11	Review Initial ID Tail Message for Tx1	(PW) 50 0 99 *	none	
12-11	Review Normal ID Tail Message for Tx1	(PW) 50 1 99 *	none	
12-10	Select Initial ID Programmable Tail Message for Tx1	(PW) 31 28 (message) *	none	
12-10	Select Normal ID Programmable Tail Message for Tx1	(PW) 31 29 (message) *	none	
12-10	Review Initial ID Programmable Tail Message for Tx1	(PW) 34 28 *	none	
12-10	Review Normal ID Programmable Tail Message for Tx1	(PW) 34 29 *	none	
12-12	Enable/Disable ID During Autopatch	(PW) 63 09 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled	
13-1	**Links**			
13-2	Enable/Disable Path 1 (Rx1 to Tx1)	(PW) 63 81 x * 0 = OFF (disabled 1 = ON (enabled)	ON enabled	
13-2	Enable/Disable Path 2 (Rx2 to Tx1)	(PW) 63 82 x * 0 = OFF (disabled 1 = ON (enabled)	ON enabled	
13-2	Enable/Disable Path 3 (Rx3 to Tx1)	(PW) 63 83 x * 0 = OFF (disabled 1 = ON (enabled)	ON enabled	

Command Quick Reference

Page	Command Name	Form and Data Digit	Default	User
13-2	Enable/Disable Path 4 (Rx1 to Tx2)	(PW) 63 84 x * 0 = OFF (disabled 1 = ON (enabled)	ON enabled	
13-2	Enable/Disable Path 5 (Rx2 to Tx2)	(PW) 63 85 x * 0 = OFF (disabled 1 = ON (enabled)	ON enabled	
13-2	Enable/Disable Path 6 (Rx3 to Tx2)	(PW) 63 86 x * 0 = OFF (disabled 1 = ON (enabled)	ON enabled	
13-5	Select Rx1-to-Tx1 Access Mode (Path 1)	(PW) 57 00 x * 0 = no access 1 = carrier access 2 = PL access 3 = And-PL access 4 = Or-PL access 5 = Anti-PL access 6 = Always access	1 carrier access	
13-5	Select Rx2-to-Tx1 Access Mode (Path 2)	(PW) 57 01 x * Same as above	1 carrier access	
13-5	Select Rx3-to-Tx1 Access Mode (Path 3)	(PW) 57 02 x * Same as above	1 carrier access	
13-5	Select Rx1-to-Tx2 Access Mode (Path 4)	(PW) 57 03 x * Same as above	1 carrier access	
13-5	Select Rx2-to-Tx2 Access Mode (Path 5)	(PW) 57 04 x * Same as above	1 carrier access	
13-5	Select Rx3-to-Tx2 Access Mode (Path 6)	(PW) 57 05 x * Same as above	1 carrier access	
14-1	**Logic Inputs**			
14-2	Assign Macro to Logic Input 1 Hi-to-Lo	(PW) 26 20 (macro name) *	none	
14-2	Assign Macro to Logic Input 1 Lo-to-Hi	(PW) 26 21 (macro name) *	none	
14-2	Assign Macro to Logic Input 2 Hi-to-Lo	(PW) 26 22 (macro name) *	none	
14-2	Assign Macro to Logic Input 2 Lo-to-Hi	(PW) 26 23 (macro name) *	none	
14-2	Assign Macro to Logic Input 3 Hi-to-Lo	(PW) 26 24 (macro name) *	none	
14-2	Assign Macro to Logic Input 3 Lo-to-Hi	(PW) 26 25 (macro name) *	none	
14-2	Assign Macro to Logic Input 4 Hi-to-Lo	(PW) 26 26 (macro name) *	none	
14-2	Assign Macro to Logic Input 4 Lo-to-Hi	(PW) 26 27 (macro name) *	none	
14-2	Assign Macro to Logic Input 5 Hi-to-Lo	(PW) 26 28 (macro name) *	none	
14-2	Assign Macro to Logic Input 5 Lo-to-Hi	(PW) 26 29 (macro name) *	none	
14-2	Assign Macro to Logic Input 6 Hi-to-Lo	(PW) 26 30 (macro name) *	none	
14-2	Assign Macro to Logic Input 6 Lo-to-Hi	(PW) 26 31 (macro name) *	none	
14-2	Assign Macro to Phone Line Busy Input Hi-to-Lo	(PW) 26 32 (macro name) *	none	

Command Quick Reference

Page	Command Name	Form and Data Digit	Default	User
14-2	Assign Macro to Phone Line Busy Input Lo-to-Hi	(PW) 26 33 (macro name) *	none	
14-2	Assign Macro to COR Input 1 Hi-to-Lo	(PW) 26 34 (macro name) *	none	
14-2	Assign Macro to COR Input 1 Lo-to-Hi	(PW) 26 35 (macro name) *	none	
14-2	Assign Macro to COR Input 2 Hi-to-Lo	(PW) 26 36 (macro name) *	none	
14-2	Assign Macro to COR Input 2 Lo-to-Hi	(PW) 26 37 (macro name) *	none	
14-2	Assign Macro to COR Input 3 Hi-to-Lo	(PW) 26 38 (macro name) *	none	
14-2	Assign Macro to COR Input 3 Lo-to-Hi	(PW) 26 39 (macro name) *	none	
14-3	Assign Macro to PL Input 1 Hi-to-Lo	(PW) 26 40 (macro name) *	none	
14-3	Assign Macro to PL Input 1 Lo-to-Hi	(PW) 26 41 (macro name) *	none	
14-3	Assign Macro to PL Input 2 Hi-to-Lo	(PW) 26 42 (macro name) *	none	
14-3	Assign Macro to PL Input 2 Lo-to-Hi	(PW) 26 43 (macro name) *	none	
14-3	Assign Macro to PL Input 3 Hi-to-Lo	(PW) 26 44 (macro name) *	none	
14-3	Assign Macro to PL Input 3 Lo-to-Hi	(PW) 26 45 (macro name) *	none	
15-1	**Logic Outputs**			
15-2	Select Logic Outputs Latched OFF	(PW) 71 (list of outputs 1-7) *	all OFF disabled	
15-2	Select Logic Outputs Latched ON	(PW) 70 (list of outputs 1-7) *	all OFF disabled	
15-2	Select Logic Outputs Momentary OFF	(PW) 73 (list of outputs 1-7) *	all OFF disabled	
15-2	Select Logic Outputs Momentary ON	(PW) 72 (list of outputs 1-7) *	all OFF disabled	
16-1	**Receiver Functions**			
16-2	Select Rx1 Start-of-Activity Macro	(PW) 26 67 (macro name) *	none	
16-2	Select Rx1 Post-Activity Macro	(PW) 26 68 (macro name) *	none	
16-2	Select Rx2 Start-of-Activity Macro	(PW) 26 69 (macro name) *	none	
16-2	Select Rx2 Post-Activity Macro	(PW) 26 70 (macro name) *	none	
16-2	Select Rx3 Start-of-Activity Macro	(PW) 26 71 (macro name) *	none	
16-2	Select Rx3 Post-Activity Macro	(PW) 26 72 (macro name) *	none	
16-2	Select Rx1 Post-Activity Timer	(PW) 99 00 xx * (00-99) = 0.0-9.9 minutes.	1.0 minute	
16-2	Select Rx2 Post-Activity Timer	(PW) 99 01 xx * (00-99) = 0.0-9.9 minutes.	1.0 minute	
16-2	Select Rx3 Post-Activity Timer	(PW) 99 02 xx * (00-99) = 0.0-9.9 minutes.	1.0 minute	
16-4	Select COR Pulse-Triggered Macro	(PW) 26 17 (macro name) *	none	

Command Quick Reference

Page	Command Name	Form and Data Digit	Default	User
16-4	Select COR Pulse Parameters	(PW) 47 0 x yyyy zzzz * x = *pulse count* (0-9) = 0-9 pulses 0 = 0 pulses 1 = 1 pulse 5 = 5 pulses ... etc. y = *minimum duration* (0001-9999) = 0.01-99.99 seconds 0001 = 0.01 seconds 0010 = 0.10 seconds 0100 = 1.00 seconds 1000 = 10.00 seconds 9999 = 99.99 seconds ... etc. z = *window time* Same as minimum duration	3 pulses, 0.5 second minimum duration, 5.0 second window time	
16-6	Enable/Disable End-of-Transmission Command Execution for Rx1	(PW) 63 57 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled (*) required to terminate commands	
16-6	Enable/Disable End-of-Transmission Command Execution for Rx2	(PW) 63 58 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled (*) required to terminate commands	
16-6	Enable/Disable End-of-Transmission Command Execution for Rx3	(PW) 63 59 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled (*) required to terminate commands	
16-8	Enable/Disable From-Start-of-Transmission Timer for Rx1	(PW) 63 64 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled	
16-8	Enable/Disable From-Start-of-Transmission Timer for Rx2	(PW) 63 65 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled	
16-8	Enable/Disable From-Start-of-Transmission Timer for Rx3	(PW) 63 66 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled	
17-1	**Transmitter Functions**			
17-3	Select Courtesy Delay	(PW) 32 xx * (00-50) = 0.0-5.0 seconds 00 = 0.0 seconds 05 = 0.5 seconds 10 = 1.0 seconds 50 = 5.0 seconds ... etc.	0.0 seconds	

Command Quick Reference

Page	Command Name	Form and Data Digit	Default	User
17-4	Select Dropout Delay	(PW) 30 xx * (00-50) = 0.0-5.0 seconds 00 = 0.0 seconds 05 = 0.5 seconds 10 = 1.0 seconds 50 = 5.0 seconds ... etc.	3.0 seconds	
17-5	Select Transmitter Timeout Timer	(PW) 40 xxx * (001-546) = 0.1-54.6 minutes 000 = infinity 001 = 0.1 minute 030 = 3.0 minutes 546 = 54.6 minutes ... etc.	3.0 minutes	
17-7	Reset Transmitter Timeout Timer	(PW) 10 *	none	
17-8	Enable/Disable Transmitter 1	(PW) 63 00 x * 0 = OFF (disabled) 1 = ON (enabled)	ON enabled	
17-8	Enable/Disable Transmitter 2	(PW) 63 22 x * 0 = OFF (disabled) 1 = ON (enabled)	ON enabled	
17-9	Key Transmitter (Timed)	(PW) 00 x yyy * x = *transmitter* 1 = Tx1 2 = Tx2 y = *duration* 000 = *cancel tx key* (001-546) = 0.1-54.6 minutes 001 = 0.1 minute 010 = 1.0 minute 100 = 10.0 minutes 546 = 54.6 minutes ... etc.	Tx1 and Tx2 not requested to key	
17-10	Key Transmitter 1 (Untimed)	(PW) 63 41 x * 0 = cancel tx key 1 = key tx	0 cancel tx key	
17-10	Key Transmitter 2 (Untimed)	(PW) 63 42 x * 0 = cancel tx key 1 = key tx	0 cancel tx key	
17-11	Enable/Disable Tx1 Minimum Unkey Delay	(PW) 63 31 x * 0 = OFF (disabled) 1 = ON (enabled)	ON enabled	
17-11	Enable/Disable Tx2 Minimum Unkey Delay	(PW) 63 32 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled	
17-16	Select Tx1 Minimum Unkey Delay	(PW) 49 98 xx * (00-10) = 0-1.0 second 00 = 0.0 second 01 = 0.1 second 10 = 1.0 second ... etc.	0.1 second	

Command Quick Reference

Page	Command Name	Form and Data Digit	Default	User
17-16	Select Tx2 Minimum Unkey Delay	(PW) 49 99 xxxx * (0000-6553) = 0-655.3 seconds 0000 = 0.0 second 0001 = 0.1 second 0010 = 1.0 second 0100 = 10.0 seconds 6553 = 655.3 seconds ... etc.	0.1 second	
17-13	Assign Macro to Tx1 PTT Inactive-to-Active	(PW) 26 82 (macro name) *	none	
17-13	Assign Macro to Tx1 PTT Active-to-Inactive Before Unkey Delay	(PW) 26 83 (macro name) *	none	
17-13	Assign Macro to Tx1 PTT Active-to-Inactive After Unkey Delay	(PW) 26 84 (macro name) *	none	
17-13	Assign Macro to Tx2 PTT Inactive-to-Active	(PW) 26 85 (macro name) *	none	
17-13	Assign Macro to Tx2 PTT Active-to-Inactive Before Unkey Delay	(PW) 26 86 (macro name) *	none	
17-13	Assign Macro to Tx2 PTT Active-to-Inactive After Unkey Delay	(PW) 26 87 (macro name) *	none	
18-1	**Repeater Functions**			
18-2	Select Repeater Access Mode (Path 1)	(PW) 57 00 x * 0 = no access 1 = carrier access 2 = PL access 3 = And-PL access 4 = Or-PL access 5 = Anti-PL access 6 = Always access	1 carrier access	
18-4	Select Repeater Start-of-Activity Macro	(PW) 26 14 (macro name) *	none	
18-4	Select Repeater Post-Activity Macro	(PW) 26 15 (macro name) *	none	
18-4	Select Repeater Activity Counter/Timer	(PW) 45 x yy * x = *event counter* 0-9 0 = each time 1 = every other time ... etc. y = *duration* (00-99) = 0.0-9.9 minutes	0 event count, 1.0 minute duration	
18-6	Select Anti-Kerchunk Key-Up Delay	(PW) 80 xx * (00-99) = 0.0-9.9 seconds	0 seconds	
18-6	Select Anti-Kerchunk Re-Arm Delay	(PW) 99 10 xx * (00-99) = 0.0-9.9 minutes	0 minutes	
18-9	Select Courtesy Message for Rx1	(PW) 31 10 (message) *	60 mS 440 Hz beep (9910 74 09)	
18-9	Select Courtesy Message for Rx2	(PW) 31 11 (message) *	60 mS 660 Hz beep (9910 74 16)	

Command Quick Reference

Page	Command Name	Form and Data Digit	Default	User
18-9	Select Courtesy Message for Rx3	(PW) 31 12 (message) *	60 mS 880 Hz beep (9910 74 21)	
18-9	Review Courtesy Message for Rx1	(PW) 34 10 *	none	
18-9	Review Courtesy Message for Rx2	(PW) 34 11 *	none	
18-9	Review Courtesy Message for Rx3	(PW) 34 12 *	none	
18-11	Assign Macro to All-Receivers-Inactive	(PW) 26 09 (macro name) *	none	
18-11	Assign Macro to Courtesy Message	(PW) 26 10 (macro name) *	none	
18-11	Assign Macro to Any-Receiver-Active	(PW) 26 11 (macro name) *	none	
18-11	Assign Macro to Repeater Timeout	(PW) 26 18 (macro name) *	none	
18-11	Assign Macro to Return-From-Timeout	(PW) 26 19 (macro name) *	none	
19-1	**Base Station Functions**			
19-2	Enable/Disable Star/Pound Talkout	(PW) 63 13 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled	
19-4	Select Talkout Transmitter Mode	(PW) 63 14 x * 0 = Repeater Mode 1 = Base Station Mode	0, Repeater Mode	
19-5	Enable/Disable Command Execution on Interdigit Timer for Rx1	(PW) 63 60 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled	
19-5	Enable/Disable Command Execution on Interdigit Timer for Rx2	(PW) 63 61 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled	
19-5	Enable/Disable Command Execution on Interdigit Timer for Rx3	(PW) 63 62 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled	
19-5	Enable/Disable Command Execution on Interdigit Timer for Phone Line	(PW) 63 63 x * 0 = OFF (disabled) 1 = ON (enabled)	OFF disabled	
20-1	**User Timers**			
20-2	Set Timer Timeout	(PW) 49 xx 03 yyyy * xx = *timer number*, 00-09 yyyy = *timeout* (0001-6553) = 0.1-655.3 seconds	1.0 second	
20-3	Set Timer Event Macro	(PW) 49 xx 02 (macro name)* xx = *timer number*, 00-09	none	
20-4	Stop Timer	(PW) 49 xx 00 * xx = *timer number*, 00-09	none	
20-5	Start/Restart Timer (Retriggerable)	(PW) 49 xx 01 * xx = *timer number*, 00-09	none	
20-6	Start Timer (One-Shot)	(PW) 49 xx 04 * xx = *timer number*, 00-09	none	

Command Quick Reference

Page	Command Name	Form and Data Digit	Default	User
21-1	**Remote Base**			
21-5	**Remote Base Configuration**			
21-4	Assign Remote Base Password	(PW) 39 02 (new password)*	98	
21-5	Select Remote Base Access-Triggered Macro	(PW) 26 91 (macro name) * Note: invoked by *Access Remote Base* command.	none	
21-6	Select Remote Base Dump-Triggered Macro	(PW) 26 90 (macro name) * Note: invoked by *Dump Remote Base* command.	none	
21-6	Select Remote Base Off Message	(PW) 31 60 (message) *	OFF in CW	
21-6	Review Remote Base Off Message	(PW) 34 60 *	OFF in CW	
21-7	Reset RBI-1	(PW) 39 91 *	none	
21-8	Enable/Disable Remote Base -- Control Operator	(PW) 63 71 x * 0 = OFF (disabled) 1 = ON (enabled) Note: used by the Control Operator to enable/disable the remote base. Note: Remote Base enabled when (En71 AND (En72 OR En73)) = TRUE.	OFF disabled	
21-8	Enable/Disable Remote Base -- Scheduler	(PW) 63 72 x * 0 = OFF (disabled) 1 = ON (enabled) Note: used by the Scheduler to enable/disable the remote base. Note: Remote Base enabled when (En71 AND (En72 OR En73)) = TRUE.	ON enabled	
21-8	Enable/Disable Remote Base -- Control Operator Override Scheduler Disable	(PW) 63 73 x * 0 = OFF (disabled) 1 = ON (enabled) Note: used by the Control Operator to override a scheduler disable of the remote base. Note: Remote Base enabled when (En71 AND (En72 OR En73)) = TRUE.	OFF disabled	
21-10	**Remote Base User Commands**			
21-12	Access Remote Base	(RBPW) 1 *		
21-13	Dump Remote Base	(RBPW) 0 *		
21-14	Speak Radio Configuration	(RBPW) 19 x * 0 = Frequency and Offset 1 = CTCSS Frequency 2 = Both 3 = Abbreviated Freq and Offset 4 = Abbreviated CTCSS Frequency 5 = Abbreviated Both	0	

Command Quick Reference

Page	Command Name	Form and Data Digit	Default	User
21-16	Select Memory Channel and Band	(RBPW) 40 (band, channel) * *band* = 1 = 144 2 = 222 4 = 440 8 = 1200 *channel* = 1 thru maximum supported	none	
21-16	Macro: Select Memory Channel and Band	(RBPW) 20 (band, channel) * *band* = 1 = 144 2 = 222 4 = 440 8 = 1200 *channel* = 1 thru maximum supported	none	
21-17	Select VFO Frequency and Offset	(RBPW) 41 (frequency, offset) * *frequency* 140.000 thru 149.995, 6-digits 220.000 thru 229.995, 6-digits 420.000 thru 449.995, 6-digits 1240.000 thru 1299.995, 7-digits The 1kHz digit can be only 0 or 5. *offset* 1 = Minus 2 = Simplex 3 = Plus 0 = On 1200, Minus 20. On 420-440, special offset depending on radio.	none	
21-17	Macro: Select VFO Frequency and Offset	(RBPW) 21 (frequency, offset) * *frequency* = 140.000 thru 149.995, 6-digits 220.000 thru 229.995, 6-digits 420.000 thru 449.995, 6-digits 1240.000 thru 1299.995, 7-digits The 1kHz digit can be only 0 or 5. *offset* = 1 = Minus 2 = Simplex 3 = Plus 0 = On 1200, Minus 20. On 420-440, special offset depending on radio.	none	
21-19	Select Transmitter Offset	(RBPW) 42 (offset) * offset: 1 = Minus 2 = Simplex 3 = Plus 0 = On 1200, Minus 20. On 420-440, special offset depending on radio.	none	

Command Quick Reference

Page	Command Name	Form and Data Digit	Default	User
21-19	Macro: Select Transmitter Offset	(RBPW) 22 (offset) * *offset* = 1 = Minus 2 = Simplex 3 = Plus 0 = On 1200, Minus 20. On 420-440, special offset depending on radio.	none	
21-20	Enable/Disable Transmitter	(RBPW) 45 x * 1 = Enable 0 = Disable	disabled	
21-20	Macro: Enable/Disable Transmitter	(RBPW) 25 x * 1 = Enable 0 = Disable	disabled	
21-21	Enable/Disable Receiver	(RBPW) 44 x * 1 = Enable 0 = Disable	enabled	
21-21	Macro: Enable/Disable Receiver	(RBPW) 24 x * 1 = Enable 0 = Disable	enabled	
21-22	Enable/Disable Radio Power	(RBPW) 46 x * 1 = Enable 0 = Disable	enabled	
21-22	Macro: Enable/Disable Radio Power	(RBPW) 26 x * 1 = Enable 0 = Disable	enabled	
21-23	Select Transmitter Power Output	(RBPW) 43 x * 1 = Low 2 = Medium 3 = High	none	
21-23	Macro: Select Transmitter Power Output	(RBPW) 23 x * 1 = Low 2 = Medium 3 = High	none	
21-24	Select Frequency of CTCSS	(RBPW) 47 (tone code) * See Page 10-5 for frequencies of 67.0 through 203.5. Above 203.5, use: 33 = 210.7 24 = 218.1 35 = 225.7 36 = 233.6 37 = 241.8 38 = 250.3	none	
21-24	Macro: Select Frequency of CTCSS	(RBPW) 27 (tone code) * See Page 10-5 for frequencies of 67.0 through 203.5. Above 203.5, use: 33 = 210.7 24 = 218.1 35 = 225.7 36 = 233.6 37 = 241.8 38 = 250.3	none	

Command Quick Reference

Page	Command Name	Form and Data Digit	Default	User
21-25	Enable/Disable CTCSS Encoder	(RBPW) 48 x * 1 = Enable 0 = Disable	disabled	
21-25	Macro: Enable/Disable CTCSS Encoder	(RBPW) 28 x * 1 = Enable 0 = Disable	disabled	
21-26	Enable/Disable CTCSS Decoder	(RBPW) 49 x * 1 = Enable 0 = Disable	disabled	
21-26	Macro: Enable/Disable CTCSS Decoder	(RBPW) 29 x * 1 = Enable 0 = Disable	disabled	
21-27	Send Current Settings	(RBPW) 39 *	none	
21-28	**Remote Base User Function Outputs**			
21-29	Select *RBI-1* Number of User Function Outputs in Group	(PW) 39 90 (number in group) *	8	
21-30	Select Individual RBI-1 User Function Outputs Latched ON	(RBPW) 11 (list of outputs 1-8) *	none	
21-30	Select Individual RBI-1 User Function Outputs Latched OFF	(RBPW) 12 (list of outputs 1-8) *	none	
21-31	Enter RBI-1 User Function Output Group	(RBPW) 10 (decimal number) * The decimal number can be set to 0 through the maximum set in the *Select Number of User Function Outputs* command. The following ranges are available by number of outputs: 0 = none available 1 = 0 or 1 2 = 0 thru 3 3 = 0 thru 7 4 = 0 thru 15 5 = 0 thru 31 6 = 0 thru 63 7 = 0 thru 127 8 = 0 thru 255	none	

Message Run-Time Variables

Run-Time Variable	Meaning	Example
9810	hour & minute, 12-hr format CW	2 45 in CW
9811	AM/PM, CW	PM in CW
9812	hour & minute, 24-hr format, CW	14 45 in CW
9813	day-of-week, CW	WED in CW
9814	month, CW	1 in CW
9815	day-of-month, CW	1 in CW
9816	seconds, CW	27 in CW
9820	hour & minute, 12-hr format, male voice	two forty-five (male)
9821	AM/PM, male voice	PM (male)
9822	hour & minute, 12-hr format, female voice	two forty-five (female)
9823	AM/PM, female voice	PM (female)
9824	hour & minute, 24-hr format, male voice	14 hours, 45 minutes (male)
9825	same as 9824 without “hours” & “minutes”	fourteen forty-five (male)
9826	day-of-week, male voice	Wednesday (male)
9827	cardinal day-of-month, male voice	one (male)
9828	ordinal day-of-month, male voice	first (male)
9829	month, male voice	January (male)
9830	“good morning/good afternoon/good evening”, female voice	good afternoon (female)
9831	“morning/afternoon/evening”, male voice	afternoon (male)
9832	seconds, male voice	twenty-seven (male)
9896	Call Count, CW	105 in CW
9897	Call Count, male voice	one zero five (male)
9898	Software Version, CW	202 in CW
9899	Software Version, male voice	two point zero two (male)

Message Control Characters

Control Character	Definition
9900	CW characters follow
9910	beep characters follow
9920	single-tone page follows
9930	two-tone page follows
9940	5/6-tone page follows
9950	DTMF characters follow
9960	synthesized speech characters follow
9981	route this message to transmitter #1 mixed with other audio
9982	route this message to transmitter #1 not mixed with other audio
9983	route this message to transmitter #2 mixed with other audio
9984	route this message to transmitter #2 not mixed with other audio
9985	route this message to phone line mixed with Rx audio
9986	route this message to phone line not mixed with Rx audio
9987	do not route remaining message audio to transmitter #1
9988	do not route remaining message audio to transmitter #2
9989	do not route remaining message audio to phone line
9999 xxxx	execute macro xxxx after prior message audio has been sent

Scheduler Day Code Table

Day Code	Explanation	Day Code	Explanation
01-31	calendar day-of-month	54	2nd Saturday of month
32	weekdays (Mon-Fri)	55	3rd Sunday of month
33	weekends (Sat-Sun)	56	3rd Monday of month
34	Sundays	57	3rd Tuesday of month
35	Mondays	58	3rd Wednesday of month
36	Tuesdays	59	3rd Thursday of month
37	Wednesdays	60	3rd Friday of month
38	Thursdays	61	3rd Saturday of month
39	Fridays	62	4th Sunday of month
40	Saturdays	63	4th Monday of month
41	1st Sunday of month	64	4th Tuesday of month
42	1st Monday of month	65	4th Wednesday of month
43	1st Tuesday of month	66	4th Thursday of month
44	1st Wednesday of month	67	4th Friday of month
45	1st Thursday of month	68	4th Saturday of month
46	1st Friday of month	69	5th Sunday of month
47	1st Saturday of month	70	5th Monday of month
48	2nd Sunday of month	71	5th Tuesday of month
49	2nd Monday of month	72	5th Wednesday of month
50	2nd Tuesday of month	73	5th Thursday of month
51	2nd Wednesday of month	74	5th Friday of month
52	2nd Thursday of month	75	5th Saturday of month
53	2nd Friday of month	99	every day (*wild card*)

Root Numbers (Commands) by Number

Page	Number	Description
17-9	00	Key Transmitter (Timed)
10-2	02	Enable/Disable CTCSS Encoder
10-3	03	Select Frequency of CTCSS
4-11 4-18	06	Select Frequency of CW/Beep
17-7	10	Reset Transmitter Timeout Timer
4-12	11	Send Next CW Message Slowly
4-13	12	Select Normal CW Speed
4-13	13	Select Slow CW Speed
4-39	15	Send Message
6-5	20	Create New Macro
6-10	21	Erase Macro
6-11	22	Erase All Macros
7-22	23	Change Autopatch Access Password
8-2	25	Set Clock and Calendar
A-50	26	Set Event-Triggered Macro *(See table page A-50.)*
6-12	27	Rename Macro
9-2	28	Create Scheduler Setpoint
6-7	29	Append to Macro
17-4	30	Select Transmitter Dropout Delay
A-52	31	Select Message *(See table page A-52.)*
17-3	32	Select Transmitter Courtesy Delay
6-9	33	List Macro in CW
A-52	34	Review Message *(See table page A-52.)*
6-17	35	List Macro in Speech
21-4	39 02	Assign Remote Base Password
21-29	39 90	Select *RBI-1* Number of User Function Outputs in Group
21-7	39 91	Reset *RBI-1*
17-5	40	Select Transmitter Timeout Timer
18-4	45	Select Repeater Activity Counter/Timer
16-4	47	Select COR Pulse Parameters
8-4	48	Adjust Daylight Savings Time
20-1 A-53	49	User Timers Set xxx.x Seconds Timers *(See table page A-53.)*
12-11	50	Select ID Tail Message
12-5	51	Select ID Message Interval
12-6	54	Reset Initial ID Message to Normal ID Message for Tx1
12-7	55	Send Initial ID Message for Tx1
A-53	57	Select Access Mode *(See table page A-53.)*
7-60	60	Select Autopatch Call Types
7-5	61	Select Autopatch Dialing Mode

Root Numbers (Commands) by Number

A-54	63	Enable/Disable Software Switches *(See page A-54.)*
7-41	64	Select Phone Line Answer Mode
7-15	65	Select Autopatch Timeout Timer
7-30	67	Enter/Clear Autopatch Reject Number Table
7-28	68	Enter/Clear Autopatch Accepted Number Table
7-36	69	Clear Autopatch Call Counter
15-2	70	Select Logic Outputs Latched ON
15-2	71	Select Logic Outputs Latched OFF
15-2	72	Select Logic Outputs Momentary ON
15-2	73	Select Logic Outputs Momentary OFF
7-44	79	Select Phone Line Off-Hook Timer
18-6	80	Select Repeater Anti-Kerchunk Key-Up Delay
7-16	81	Reset Autopatch Timeout Timer
11-7	82	Select DTMF Decoder Interdigit Timer
7-9	83	Dump Autopatch Using A Code
7-54	83 1	Landline Hookflash
7-55	83 2	Autopatch Go Off-Hook
7-55	83 3	Autopatch Go Off-Hook, Ignore Busy Logic Input
7-56	83 10	Select/Delete Autopatch Dialing Prefix
7-33	84	Autopatch Redial Last Number
7-34	85	Clear Autopatch Redialer
7-37	86	Send Autopatch Call Count in CW
7-47	87	Trigger Reverse Patch
7-48	88	Answer Reverse Patch
11-3	89	Select DTMF Priority/Scan
5-2	92	Assign Control Operator Password
5-3	93	Assign Master Password
5-4	94	Assign Control Operator Privilege level
11-8	96	Select DTMF Decoder Mute Delay
6-14	98	Pause Command Execution
A-55	99	Select xx.x Minute Timers *(See table page A-55.)*

Event Macros by Number

Assign with (PW) 26 (number) (macro) *
Erase with (PW) 26 (number) *

Page	Number	Description
6-15	00	Power-On Reset Macro
12-4	03	Initial ID Macro for Tx1
12-4	04	Normal ID Macro for Tx1
12-4	05	Impolite ID Macro for Tx1
18-11	09	All-Receivers-Inactive-Triggered Macro
18-11	10	Courtesy Message-Triggered Macro
18-11	11	Any-Receiver-Active-Triggered Macro
7-10	12	Autopatch Access-Triggered Macro
7-10	13	Autopatch Dump-Triggered Macro
18-4	14	Repeater Start-of-Activity Macro
18-4	15	Repeater Post-Activity Macro
7-43	16	Phone Line Answer Macro
16-4	17	COR Pulse-Triggered Macro
18-11	18	Repeater Timeout Macro
18-11	19	Repeater Return-From-Timeout Macro
14-2	20	Logic Input 1 Hi-to-Lo Macro
14-2	21	Logic Input 1 Lo-to-Hi Macro
14-2	22	Logic Input 2 Hi-to-Lo Macro
14-2	23	Logic Input 2 Lo-to-Hi Macro
14-2	24	Logic Input 3 Hi-to-Lo Macro
14-2	25	Logic Input 3 Lo-to-Hi Macro
14-2	26	Logic Input 4 Hi-to-Lo Macro
14-2	27	Logic Input 4 Lo-to-Hi Macro
14-2	28	Logic Input 5 Hi-to-Lo Macro
14-2	29	Logic Input 5 Lo-to-Hi Macro
14-2	30	Logic Input 6 Hi-to-Lo Macro
14-2	31	Logic Input 6 Lo-to-Hi Macro
14-2	32	Phone Line Busy Input Hi-to-Lo Macro
14-2	33	Phone Line Busy Input Lo-to-Hi Macro
14-2	34	COR Input 1 Hi-to-Lo Macro
14-2	35	COR Input 1 Lo-to-Hi Macro
14-2	36	COR Input 2 Hi-to-Lo Macro
14-2	37	COR Input 2 Lo-to-Hi Macro
14-2	38	COR Input 3 Hi-to-Lo Macro
14-2	39	COR Input 3 Lo-to-Hi Macro
14-2	40	PL Input 1 Hi-to-Lo Macro
14-2	41	PL Input 1 Lo-to-Hi Macro
14-2	42	PL Input 2 Hi-to-Lo Macro

Event Macros by Number

Assign with (PW) 26 (number) (macro) *
Erase with (PW) 26 (number) *

14-2	43	PL Input 2 Lo-to-Hi Macro
14-2	44	PL Input 3 Hi-to-Lo Macro
14-2	45	PL Input 3 Lo-to-Hi Macro
12-4	46	Initial ID Macro for Tx2
12-4	47	Normal ID Macro for Tx2
12-4	48	Impolite ID Macro for Tx2
11-11	50	Long-Tone Zero Macro
11-11	51	Long-Tone One Macro
11-11	52	Long-Tone Two Macro
11-11	53	Long-Tone Three Macro
11-11	54	Long-Tone Four Macro
11-11	55	Long-Tone Five Macro
11-11	56	Long-Tone Six Macro
11-11	57	Long-Tone Seven Macro
11-11	58	Long-Tone Eight Macro
11-11	59	Long-Tone Nine Macro
11-11	60	Long-Tone A Macro
11-11	61	Long-Tone B Macro
11-11	62	Long-Tone C Macro
11-11	63	Long-Tone D Macro
11-11	64	Long-Tone Star (*) Macro
11-11	65	Long-Tone Pound (#) Macro
16-2	67	Rx1Start-of-Activity Macro
16-2	68	Rx1 Post-Activity Macro
16-2	69	Rx2 Start-of-Activity Macro
16-2	70	Rx2 Post-Activity Macro
16-2	71	Rx3 Start-of-Activity Macro
16-2	72	Rx3 Post-Activity Macro
7-63	80	Phone Line Incoming Ring-Triggered Macro
7-62	81	Control Line Dump Macro
17-13	82	Tx1 Inactive-to-Active Macro
17-13	83	Tx1 Active-to-Inactive Before Unkey Delay Macro
17-13	84	Tx1 Active-to-Inactive Macro
17-13	85	Tx2 Inactive-to-Active Macro
17-13	86	Tx2 Active-to-Inactive Before Unkey Delay Macro
17-13	87	Tx2 Active-to-Inactive Macro
21-5	90	Remote Base Access-Triggered Macro
21-5	91	Remote Base Dump-Triggered Macro

Messages by Number

Program with (PW) 31 (number) (message) *
Review with (PW) 34 (number) *

Page	Number	Description	Default
18-9	10	Courtesy Message for Rx1	60 mS 440 Hz (74 09)
18-9	11	Courtesy Message for Rx2	60 mS 660 Hz (74 16)
18-9	12	Courtesy Message for Rx3	60 mS 880 Hz (74 21)
4-35	13	Dropout Message	none
4-35	16	Pre-Timeout Message	TO in CW
4-35	19	Post-Timeout Message	TO in CW
12-10	28	Initial ID Programmable Tail Message for Tx1	none
12-10	29	Normal ID Programmable Tail Message for Tx1	none
12-9	30	Initial ID Message for Tx1	ID in CW
12-9	31	Normal ID Message for Tx1	ID in CW
12-9	32	Impolite ID Message for Tx1	none
12-9	33	Initial ID Message for Tx2	9983 ID in CW
12-9	34	Normal ID Message for Tx2	9983 ID in CW
12-9	35	Impolite ID Message for Tx2	none
7-6	40	Autopatch Dialing Message	AS in CW
7-17	41	Autopatch Timeout Warning Message	AR in CW
7-51	42	Landline Busy Message	BZ in CW
7-51	43	Autopatch Dump Message	none
7-51	44	Autopatch Off Message	OFF in CW
7-51	45	Autopatch Error Message (Invalid phone number)	?ERR in CW
7-51	46	Autopatch Reject Message (Match in Reject Table)	?REJ in CW
7-51	47	Autopatch No-Redial-Number Message	CLR in CW
7-42	50	Phone Line Answer Message	3 beeps (74 09 21 33)
7-49	51	Reverse Patch Ringout Message	55 in CW
21-6	60	Remote Base Off Message	OFF in CW

Tenth-Second Timers by Number

User Timers: (PW) 49 (number) (function) (value) *
Other Timers: (PW) 49 (number) (value) *

Page	Number	Description
20-1	00-09	User Timers
7-53	96	Autopatch Pause (“B”) Digit Time
12-13	97	Select ID Pending Interval for Tx1 and Tx2
17-16	98	Select Tx1 Unkey Delay
17-16	99	Select Tx2 Unkey Delay

Path Access Mode by Number

(PW) 57 (number) (mode) *

Page	Number	Description
13-5	00	Rx1-to-Tx1 Access Mode (Path1)
13-5	01	Rx2-to-Tx1 Access Mode (Path2)
13-5	02	Rx3-to-Tx1 Access Mode (Path3)
13-5	03	Rx1-to-Tx2 Access Mode (Path4)
13-5	04	Rx2-to-Tx2 Access Mode (Path5)
13-5	05	Rx3-to-Tx2 Access Mode (Path6)
13-5	06	Rx1-to-DTMF Decoder Access Mode
13-5	07	Rx2-to-DTMF Decoder Access Mode
13-5	08	Rx3-to-DTMF Decoder Access Mode

Software Switches by Number

(PW) 63 (number) (enable/disable) *

Page	Number	Description
17-8	00	Enable/Disable Transmitter 1
4-10	01	Enable/Disable CW
11-2	02	Enable/Disable Command Responses
7-7	04	Enable/Disable Autopatch Dialing Mixed-Mode
7-8	05	Enable/Disable Autopatch Pound Down (# Dump)
7-12	06	Enable/Disable Autopatch Privacy
7-11	07	Enable/Disable Autopatch Full-Duplex Mode
7-13	08	Enable/Disable Autopatch Repeater-to-Phone DTMF Mute
7-58	09	Enable/Disable ID During Autopatch
7-59	10	Require Autopatch Dump Before Next Call
7-23	11	Enable/Disable Autopatch Access Without Password
19-2	13	Enable/Disable Base Station Star/Pound Talkout
19-4	14	Select Base Station Talkout Transmitter Mode
9-8	15	Enable/Disable Scheduler
17-8	22	Enable/Disable Transmitter 2
7-45	23	Monitor Repeater Receiver (Rx1)
7-45	26	Monitor Repeater Receiver (Rx1) and Talk Out Tx1
17-11	31	Enable/Disable Tx1 Minimum Unkey Delay
17-11	32	Enable/Disable Tx2 Minimum Unkey Delay
17-10	41	Key Transmitter 1 (Untimed)
17-10	42	Key Transmitter 2 (Untimed)
11-9	50	Enable/Disable Rx1-Tx1 DTMF Mute
11-9	51	Enable/Disable Rx2-Tx1 DTMF Mute
11-9	52	Enable/Disable Rx3-Tx1 DTMF Mute
11-9	53	Enable/Disable Rx1-Tx2 DTMF Mute
11-9	54	Enable/Disable Rx2-Tx2 DTMF Mute
11-9	55	Enable/Disable Rx3-Tx2 DTMF Mute
16-6	57	Enable/Disable End-of-Transmission Command Execution for Rx1
16-6	58	Enable/Disable End-of-Transmission Command Execution for Rx2
16-6	59	Enable/Disable End-of-Transmission Command Execution for Rx3
19-5	60	Enable/Disable Command Execution on Interdigit Timer for Rx1
19-5	61	Enable/Disable Command Execution on Interdigit Timer for Rx2
19-5	62	Enable/Disable Command Execution on Interdigit Timer for Rx3
19-5	63	Enable/Disable Command Execution on Interdigit Timer for Phone Line
16-8	64	Enable/Disable From-Start-of-Transmission Timer for Rx1
16-8	65	Enable/Disable From-Start-of-Transmission Timer for Rx2
16-8	66	Enable/Disable From-Start-of-Transmission Timer for Rx3
21-8	70	Enable/Disable Remote Base -- Control Operator

Software Switches by Number

(PW) 63 (number) (enable/disable) *

21-8	71	Enable/Disable Remote Base -- Scheduler
21-8	72	Enable/Disable Remote Base -- Control Op Scheduler Override
13-2	81	Enable/Disable Path 1 (Rx1 to Tx1)
13-2	82	Enable/Disable Path 2 (Rx2 to Tx1)
13-2	83	Enable/Disable Path 3 (Rx3 to Tx1)
13-2	84	Enable/Disable Path 4 (Rx1 to Tx2)
13-2	85	Enable/Disable Path 5 (Rx2 to Tx2)
13-2	86	Enable/Disable Path 6 (Rx3 to Tx2)

Tenth-Minute Timers by Number

(PW) 99 (number) (value) *

Page	Number	Description
16-2	00	Rx1 Post-Activity Timer
16-2	01	Rx2 Post-Activity Timer
16-2	02	Rx3 Post-Activity Timer
18-6	10	Repeater Anti-Kerchunk Re-Arm Delay