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This is mainly a compilation of other peoples work. I, Bob, to not seek credit for something I did not do. I however will be more then happy to take credit for what I did do. I compiled most of the data you see before you. I took Mike Larsen's manual, changed a few things, and added to it. I also turned a few documents into TIFs for ease of reading. This manual was designed to make a nice printed copy of the data gathered by all parties involved. Authors names remain intact throughout this document, and in most cases, the data has not be changed.

My special `contribularity` to Mike Larsen, Dr. Who, who compiled most of the hard data contained in this manual. --bob

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Basic Commands

Before going in to the programming of the cellular phone, it is important for the user to know the normal things necessary for day to day operation. While the majority of the stuff in the users manual is intended for people that have problems programming their VCR, their are a few things that are very important and are only mentioned in the users manual.

Turn On or Off	[Pwr]
Place Call	Enter number, [Snd]
Receive Call	[Snd] or open flip fone
End Call	[End] or close flip fone
Automatic Redial	To retry call, press [Snd] before ending the unsuccessful call attempt.
Store Number	Phone number, [Sto], 2-digit location number or press [*] to autoload. If phone is Alphanumeric, display will flash "Alpha_". Press [Sto] to bypass or use keypad to enter letter (up to 14). [#] advances to next position, [*] backspaces. When finished, press [Sto].
Recall Number	[Rcl], 2-digit location number. Entering location 01, then hitting [#] will allow scrolling through all stored locations.
Recall Name	Press [Name/Menu], [#] or [*] to scroll. [Rcl] will display location number then name, [Rcl] again will display corresponding phone number and [Snd] to dial.
Recalling Last 10 Numbers Called	[Rcl], [0], [0]. Display will show "L0"' followed by the name or number of the most recently placed call. Use [#] or [*] to scroll and [Snd] to call displayed number.
Super Speed Dialing	Directory location number, [Snd]
Changing Entries	Press [Rcl] and the 2-digit location number so that the number to be changed is displayed. Press and release [Clr] to back out each of the digits. Enter a new number and press [Sto].
Call Number Displayed	[Snd]
Microphone Muting	Press [Fcn], [6]. To unmute, press [Fcn], [6]
Lock Unit	[Fcn], [5] or [LOCK]
Unlock	Three digit unlock code. If you make an error, [Clr] and enter again.
Automatic Lock	[FCN], [6] (not all phones) "EnAbLE" will appear if compatible.
Display Unlock Code	Press [Fcn], [0], your six-digit security code, [Rcl].
Changing Your Unlock Code	Press [Fcn], [0], your six-digit security code, your NEW 3-digit unlock code, [Sto].
Review Battery Meter	Press [Fcn], [4] and release.
Adjust Volume	Earpiece - Press and hold [Vol] to increase. Release, press again to decrease. Ringer - [Fcn], then Vol as above.
Recall Own Phone Number	[Rcl], [#]
Individual Call Timer	[Rcl], [#], [#]
Resettable Call Timer	[Rcl], [#], [#], [#]
Reset Resettable Call Timer	[Fcn], [0], [7], [Clr]
Cumulative Call Timer	[Rcl], [#], [#], [#], [#]
Access Features	Press [Fcn], [1]. To change features, press [*] and [#] to scroll and [Clr] to change. To exit feature menu, press [END].
Review/Scroll Menu Features	Press [*] or [#]
Status Review	[Fcn], [0], [9], [Rcl], [#] or [*] scrolls messages. To end press [END].
Changing System Type	Press [Rcl], [*]. Repeatedly press [*] until the desired system type appears. To select press [Sto].
Outgoing Call Restrictions	Press [Fcn], [0], 6-digit security code, [1], [Sto]. Phone will place calls only from memory locations 1-10. To change back to unrestricted dialing press [Fcn], [0], 6-digit security code, [4], [Sto].
Switch to Second Phone Number	[Rcl], [#], [Sto] (Press [Clr] to finish viewing newly activated number).

NAM Programming

Once the phone model and sequence number are identified, determine the program access sequence from this list.

HAND HELD PORTABLE MODELS

If the phone has a FCN button and no MENU button use sequence 1.
If the phone has no FCN button use sequence 2.
If the phone has a MENU button and a FCN button use sequence 4.

INSTALLED MOBILE PHONES AND TRANSPORTABLE MODELS

If the phone has no FCN button and no RCL button use sequence 3.
If the phone has a FCN button use sequence 4.
If the phone has a MEM button use sequence 5.
If the phone has a RCL button and no FCN button use sequence 6.

SEQUENCE#	ACCESS CODE		
1	FCN	(SECURITY CODE TWICE)	RCL
2	STO #	(SECURITY CODE TWICE)	RCL
3	CTL 0	(SECURITY CODE TWICE)	*
4	FCN 0	(SECURITY CODE TWICE)	RCL
5	FCN 0	(SECURITY CODE TWICE)	MEM
6	CTL 0	(SECURITY CODE TWICE)	RCL

The default security code is 000000. The CTL (control) button is the single black button on the side of the handset. If the security code is unknown then you can obtain it via TEST MODE access.

NAM programming:

Step 3: PROGRAMMING SEQUENCE

1.	Turn the power on. **PHONE MUST BE UNLOCK BEFORE IT CAN BE PROGRAMED**
2.	Within ten seconds enter the access sequence as determined above.
3.	The phone should now show "01" in the left of the display, this is the first programming entry step number. If it does not security code is incorrect, or the programming lock-out counter has been exceeded. In either case you can still program the unit following the steps under TEST MODE PROGRAMMING below.
4.	The * key is used to increment each step: Each time you press * the display will increment from the step number, displayed on the left, to the data stored in that st displayed on the right. When the data is displayed make any necessary changes and press * to increment to the next step numbe
5.	The SND key is used to complete and exit programming when any STEP NUMBER is displayed If you have enabled the second phone number bit in step 10 below then pressing SND will switch to NAM 2. Steps 01 thru 06, and 10 will repeat for NAM 2, the step number will be followed by a "2" to indicate NAM two.
5.	The CLR key will revert the display to the previously stored data.
6.	The # key will abort programming at any time.

PROGRAMMING DATA:

STEP#	#OF DIGITS/RANGE	DESCRIPTION
01	00000 - 32767	SYSTEM ID
02	3 DIGITS	AREA CODE
03	7 DIGITS	TEL NUMBER
04	2 DIGITS	STATION CLASS MARK
05	2 DIGITS	ACCESS OVERLOAD CLASS
06	2 DIGITS	GROUP ID (10 IN USA)
07	6 DIGITS	SECURITY CODE
08	3 DIGITS	LOCK CODE
09	0333 OR 0334	INITIAL PAGING CHANNEL
10	6 DIGIT BINARY	OPTION PROGRAMMING (SEE NOTE 1)
11	3 DIGIT BINARY	OPTION PROGRAMMING (SEE NOTE 2)

NOTES: Take care with Motorola's use of "0" and "1". Some options use "0" to enable, some use "1".

1. This is a 6 digit binary field used to select the following options:

Digit 1:	Internal handset speaker, 0 to enable.
Digit 2:	Local Use Mark, 0 or 1.
Digit 3:	MIN Mark, 0 or 1.
Digit 4:	Auto Recall, always set to 1 (enabled).
Digit 5:	Second phone number (not all phones), 1 to enable.
Digit 6:	Diversity (Two antennas, not all phones), 1 to enable.

2. This is a 3 digit binary field used to select the following options:

Digit 1:	Continuous DTMF, 1 to enable
Digit 2:	Transportable Ringer/Speaker, 0=Transducer, 1=Handset
Digit 3:	8 hour time out in transportable mode, 0 to enable

On newer models they have added and changed some numbers. The numbers as of the 3/27/92 manual are as follows:

1. The 6 digit binary field is still the same.
2. The 3 digit binary field has become a 5 digit binary field.

Digit 1:	Failed Page Indicator	1=Disable	0=Enable
Digit 2:	Motorola Enhanced Scan	1=Enable	0=Disable
Digit 3:	Long Tone DTMF	1=Enable	0=Disable
Digit 4:	Transportable Internal Ringer Speaker	1=Handset	0=Transdc
Digit 5:	Eight Hour Timeout	1=Disable	0=Enable

TEST MODE ACCESS:

INSTALLED MOBILE PHONES AND TRANSPORTABLE MODELS

To enter test mode on units with software version 85 and higher you must short pins 20 and 21 of the transceiver data connector. An RS232 break out box is useful for this, or construct a test mode adapter from standard Radio Shack parts.

For MINI TR or Silver Mini Tac transceivers (smaller data connector) you can either short pins 9 and 14 or simply use a paper clip to short the hands free microphone connector.

HAND HELD PORTABLE MODELS:

There are two basic types of Motorola portable phones, the Micro-Tac series "Flip" phones, and the larger 8000 and Ultra Classic phones. Certain newer Motorola and Pioneer badged Micro-Tac phones do not have a "flip", but follow the same procedure as the Micro-Tac.

8000 & ULTRA CLASSIC SERIES:

If you have an 8000 series phone determine the "type" before trying to enter test mode. On the back of the phone, or on the bottom in certain older models, locate the F09... number this is the series number. If the FOURTH digit of this number is a "D" you CAN NOT program the unit through test mode, a Motorola RTL4154/RTL4153 programmer is required to make any changes to this unit.

Having determined that you do not have a "D" series phone the following procedure is used to access test mode:

Remove the battery from the phone and locate the 12 contacts at the top near the antenna connector. These contacts are numbered 1 through 12 from top left through bottom right. Pin 6, top right, is the Manual Test Mode Pin. You must ground this pin while powering up the phone. Pin 7 (lower left) or the antenna connector should be used for ground. Follow one of these procedures to gain access to pin 6:

1. The top section of the battery that covers the contacts contains nothing but air. By careful measuring you can drill a small hole in the battery to gain access to pin 6, alternately simply cut the top off the
battery with a hack saw. Having gained access use a paper clip to short pin six to the antenna connector ground while powering up the phone.

2. If you do not want to "destroy" a battery you can apply an external 7.5 volts to the + and - connectors at the bottom of the phone, ground pin 6 while powering up the phone as above.

3. You can also try soldering or jamming a small jumper between pins 6 and 7 (top right to lower left), or between pin 6 and the antenna connector housing ground. Carefully replace the battery and power up the phone. Use caution with this method not to short out any other pin.

4. A cigarette lighter adapter, if you have one, also makes a great test mode adapter as it can be disassembled to give you easier access to pin 6. Many are pre marked, or even have holes in the right location. This is because they are often stamped from the same mold that the manufacturer
uses for making hands free adapter kits and these kits require access to the phone's connectors.

MICRO-TAC "FLIP" SERIES:

This phone follows similar methods as outlined for the 8000 series above.

Remove the battery and locate the three contacts at the bottom of the phone, the two outer contacts are raised and connect with the battery. The center contact is recessed, this is the Manual Test Mode connector.

Now look at the battery contacts, the two outer ones supply power to the phone, the center contact is an "extra" ground. This ground needs to be shorted to the test mode connector on the phone. The easiest way to do this is to put a small piece of solder wick, wire, aluminum foil or any other conductive material into the recess on the phone. Having done this carefully replace the battery and turn on the power, if you have been
successful the phone will wake up in test mode.

GENERAL NOTES:

HANDSETS: Most Motorola handsets are interchangeable, when a handset is used with a transceiver other than the one it was designed for the display will show "LOANER". Some features and buttons may not work, for instance if the original handset did not have a RCL or STO button, and the replacement does, you will have to use the control * or control # sequence to access memory and A/B system select procedures.

NEWER 95xx PHONES (Thank you Motorola!!!)

Many newer phones don't require grounding. If your software version number is 9526 (I think) or newer, enter this:

[FCN] [0] [0] [*] [*] [8] [3] [7] [8] [6] [6] [3] [3] [STO]

In case you have trouble remembering the number sequence, it spells out "TESTMODE." Leave it to Motorola to make this easier and easier all the time.
I have used this and it does work. This command just backs up my claim even further that esn changing via handset is a reality. It's a matter of finding the correct combination of keys.

Normal test mode commands work like usual from then on.

For some odd reason, this hasn't been included in all the 95xx phones. I believe they started it in Software 9526. This is only an estimate, so if you have a 95xx flip, let me know what software version you have and whether it works or not so this date can be isolated. Mine is a 9562 that worked.

ULTRA CLASSIC II SERIES:

Ground Pin 2 to pin 4.

LOCK/UNLOCK PROCEDURES:

Phones with "LOCK" buttons: Press lock for at least 1/2 a second.

Phones with a "FCN" button: Press FCN 5, note that 5 has the letter's "J,K, and L" for lock.

Phones with no FCN or LOCK button: Press Control 5, control is the black volume button on the side of the handset.

SYSTEM SELECT PROCEDURES:

Phones with a RCL button: Press RCL *, then * to select, STO to store.

Phones with no RCL button: Press Control * then * to select, # to store.

Options are:

CSCAn	Preferred/Non preferred with system lockout	
Std A/b, or Std b/A:	Preferred/Non preferred.	
SCAn Ab, or SCAn bA:	Non preferred/Preferred	
SCAn A:	"A" ONLY	
SCAn b:	"B" ONLY	
HOME:	Home only	

(these are typical options, some phone's vary. C-Scan is only available on newer models and does not appear unless programmed, see below.)

TEST MODE

Test mode consists of two separate levels. When the telephone is first placed in Test Mode, it is in the STATUS DISPLAY LEVEL. The display will be scrolling (or flashing), or it will be locked. If locked, enter the unlock code and the display will begin scrolling. If the unlock code is not known, press #. By pushing the # key, the technician causes the cellular telephone to change to its SERVICING LEVEL. The display will be US' . There are five types of display, depending on the model of the telephone: a 16 character display, a 14 character display, a 10 digit display (with two versions), an 8 character display, and a 7 character display. The status display is different in analog operation than in a TDMA call.

NOTE: Use of a loaner handset is allowed in servicing level, but may not be allowed in the status display level. A locked telephone will not show the status display, but will enter the servicing level.

14 Character Analog Call Display

```
+------------------+
| A B C D E F G |
| H I J K L M N |
+------------------+
```

ABC = Channel
D = *Call Processing Mode
EFG = RSSI
H = **(D)SAT
I = 1=TX on
J = 1=Signalling Tone On
K = Power Level (0-7)
L = 1=Control Channel
M = 1=RX Audio off
N = 1=TX Audio off

*Call Processing Mode:
BLANK = AMPS
A = NAMPS High Sub-Channel
B = NAMPS Center Sub-Channel
C = NAMPS Low Sub-Channel

**(D)SAT:
0 = 5970 Hz
1 = 6000 Hz
2 = 6030 Hz
3 = No SAT

0-6 = DSAT Vector
7 = No DSAT

14 Character TDMA Call Display

```
+------------------+
| A B C D E F G |
| H I J K L M N |
+------------------+
```

ABC = Channel ("A" in the position indicates a channel above 1000)
D = *Call Processing Mode
EFG = RSSI
HIJ = Digital Verification Color Code (1-255)
K = Power Level (0-7)
L = 1=TX on
M = 1=Bit Error Rate (0-7)
N = 1=Audio Muted

*Call Processing Mode
BLANK = AMPS
1 = Slot 1, half rate
2 = Slot 2, half rate
3 = Slot 3, half rate
4 = Slot 4, half rate
5 = Slot 5, half rate
6 = Slot 6, half rate
7 = Slot 1, full rate
8 = Slot 2, full rate
9 = Slot 3, full rate

NOTE: The Analog Call Display will always show when on a control channel.

NOTE: Not all commands work on all telephones. If a command is not valid the display will show "ErrOr." Not all numbers have been assigned. Not all numbers have been listed here. Some commands were intended only for Motorola factory applications. (This is the disclaimer in the technical training manual. I have included all of the other commands I have discovered one way or another. I do believe this is a complete list of the commands.)

Three test commands are significant for programming and registering the telephone for service: see full descriptions under TEST MODE COMMANDS.

32# Clears the telephone. (Older Motorola allowed either three or fifteen changes in the MIN. After that, the phone had to be sent to Motorola to reset the counter. This is the command they use.)
38# Displays the ESN
55# This is the TEST MODE PROGRAMMING (as described below).

TEST MODE PROGRAMMING:

Assuming you have completed one of the above steps correctly the phone will wake up in test mode when you turn the power on. When you first access test mode the phone's display will alternate between various status information that includes the received signal strength and channel number. The phone will operate normally in this mode. You can now access Service Mode by pressing the # key, the display will clear and a ' will appear. Use the following procedure to program the phone:

1.	Enter 55# to access programming mode.
2.	The * key advances to the next step. (NOTE that test mode programming does NOT have step numbers, each time you press the * key the phone will display the next data entry).
3.	The CLR key will revert the display to the previously stored data.
4.	The # key aborts programming at any time.
5.	To complete programming you must scroll through ALL entries until a ' appears in the display.
6.	Note that some entries contain more digits than can be displayed by the phone, in this case only the last part of the data can be seen.

TEST MODE PROGRAMING DATA: For AMPS and NAMPS Cellular Telephones

STEP#	#OF DIGITS/RANGE	DESCRIPTION
01	00000 - 32767	SYSTEM ID
02	8 DIGIT BINARY	OPTION PROGRAMING, SEE NOTE 1 BELOW
03	10 DIGITS	MIN (AREA CODE & TEL#)
04	2 DIGITS	STATION CLASS MARK, SEE NOTE 2 BELOW
05	2 DIGITS	ACCESS OVERLOAD CLASS
06	2 DIGITS	GROUP ID (10 IN USA)
07	6 DIGITS	SECURITY CODE
08	3 DIGITS	UNLOCK CODE
09	3 DIGITS	SERVICE LEVEL, SEE NOTE 3 BELOW
10	8 DIGIT BINARY	OPTION PROGRAMING, SEE NOTE 4 BELOW
11	8 DIGIT BINARY	OPTION PROGRAMING, SEE NOTE 5 BELOW
12	0333 OR 0334	INITIAL PAGING CHANNEL
13	0333	"A" SYSTEM IPCH
14	0334	"B" SYSTEM IPCH
15	3 DIGIT	NUMBER PAGING CHANNEL (021 IN USA)
16	8 DIGIT BINARY	OPTION PROGRAMING, SEE NOTE 6 BELOW

Steps 01 through 06 and 12 will repeat for NAM 2 if the second phone number bit has been enabled in step 11.

TEST MODE PROGRAMING DATA: For TDMA Cellular Telephones

STEP#	#OF DIGITS/RANGE	DESCRIPTION
01	00000 - 32767	SYSTEM ID
02	8 DIGIT BINARY	OPTION PROGRAMING, SEE NOTE 1 BELOW
03	10 DIGITS	MIN (AREA CODE & TEL#)
04	2 DIGITS	STATION CLASS MARK, SEE NOTE 2 BELOW
05	2 DIGITS	ACCESS OVERLOAD CLASS
06	2 DIGITS	GROUP ID (10 IN USA)
07	6 DIGITS	SECURITY CODE
08	3 DIGITS	LOCK CODE
09	3 DIGITS	SERVICE LEVEL, SEE NOTE 3 BELOW
10	8 DIGIT BINARY	OPTION PROGRAMING, SEE NOTE 4 BELOW
11	8 DIGIT BINARY	OPTION PROGRAMING, SEE NOTE 5 BELOW
12	0333 OR 0334	INITIAL PAGING CHANNEL
13	0333	"A" SYSTEM IPCH
14	0334	"B" SYSTEM IPCH
15	3 DIGITS	DEDICATED PAGING CHANNELS (021 IN USA)
16	3 DIGITS	SECONDARY INITIAL PAGING CHANNEL. 708 for system A, 737 for system B. Allows the TDMA telephone to be assigned to a TDMA channel in a call
17	708	SECONDARY INITIAL PAGING CHANNEL FOR SYSTEM A
18	737	SECONDARY INITIAL PAGING CHANNEL FOR SYSTEM B
19	8 DIGITS	OPTION PROGRAMMING, SEE NOTE 6 BELOW

NOTES:

Take care with Motorola's use of "0" and "1". Some options use "0" to enable, some use "1".

1. (step 02 above, suggested entry is: 11101001 for "A" system, 10101001 for "B" sys)

Digit 1	Local use mark, 0 or 1.
Digit 2	Preferred system, 1=system A, 0=system B.
Digit 3	End to end (DTMF) dialing, 1 to enable.
Digit 4	Not used, enter 0. Formerly used for test mobile.
Digit 5	Repertory (speed) dialing, 1 to enable. (Not used in TDMA)
Digit 6	Auxiliary (horn) alert, 1 to enable.
Digit 7	Hands free (VSP) auto mute, 1 to enable (mutes outgoing hands free audio until the MUTE key is pressed). (Not used in TDMA)
Digit 8	Min mark, 1 = Enabled. NOT CHANGEABLE on series II or III.

2. Station Class Mark

SCM	666 or 832 Ch.	VOX	Max Power
00	666	N	3.0 W
01	666	N	1.2 W
02	666	N	0.6 W
03			
04	666	Y	3.0 W
05	666	Y	1.2 W
06	666	Y	0.6 W
07			
08	832	N	3.0 W
09	832	N	1.2 W
10	832	N	0.6 W
11			
12	832	Y	3.0 W
13	832	Y	1.2 W
14	832	Y	0.6 W
15			

3. Service Level Codes:

001	The telephone will only dial numbers in memory locations 01, 02 and 03. No keypad entries or memory storage is possible. Restrict ALL outgoing calls by clearing locations 01, 02, and 03 and place the phone in servicing level 001. In some phones this applies to memory locations 01 - 10.
002	The telephone will dial only numbers from memory locations. The keypad is disabled and super speed dialing is not enabled.
003	Keypad dial only; no memory recall allowed.
004	Unlimited keypad and memory dialing. (DEFAULT)
005	Seven-digit dialing only
006	Full keypad and memory dialing, but memory locations 1 through 10 cannot be changed.
007	The phone will dial only from as many as 50 programmable memory locations

4. (step 10 above, suggested entry is: 00000100)

Digits 1 - 3	Not used in USA, enter 0.
Digit 4	Extended Field. When enabled, the telephone will scan more than 32 paging channels. Not used in USA, 0 to disable
Digit 5	Single system scan, 1 to enable (scan A or B system only, determined by bit 2 of step 02. Set to "0" to allow user the option).
Digit 6	Super speed dial, 1 to enable (pressing N, or NN SND will dial the number stored in memory location NN).
Digit 7	User selectable service level, 0 to enable (allows user to set long distance/memory access dialing restrictions).
Digit 8	Lock function, 0 to enable (allows user to lock/un-lock the phone, if this is set to 1 the phone can not be locked).

5. (step 11 above, suggested entry is: 00000000)

Digit 1:	Handset programming, 0 to enable (allows access to programming mode without having to enter test mode).
Digit 2:	Second phone number (not all phones), 1 to enable.
Digit 3:	Call timer access, 0 to enable. (Not used in TDMA)
Digit 4:	Auto system busy redial, 0 to enable.
Digit 5:	Internal Speaker disable, 1 to enable (use with select VSP units only, do not use with 2000 series mobiles).
Digit 6:	IMTS/Cellular, 1 to enable (rarely used).
Digit 7:	User selectable system registration, 0 to enable.
Digit 8:	Dual antenna (diversity), 1 to enable.

6. (step 16 and 19 above, suggested entry is: 0011010 for portable and 0011011 for mobile units)

Digit 1:	Enhanced Scan, when enabled, four strongest signalling channels are scanned instead of two. 1=enabled, 0-disabled.
Digit 2:	Cellular Connection, used only in series II phones if a series I cellular connection is used with a series II. 0=series II, 1=series I, 0 for ALL TDMA PHONES
Digit 3:	Continuous DTMF, 1 to enable (software version 8735 and later)
Digit 4:	Transportable Internal Ringer/Speaker. When set to 0, audio is routed to the external speaker of the transportable; 1 routes it to the handset.
Digit 5:	8 hour time-out, 0 to enable (software version 8735 and later)
Digit 6:	Not used, 0 only.
Digit 7:	Failed page indicator, 0 to enable (phone beeps when an incoming call is detected but signal conditions prevent completion of the call).
Digit 8:	Portable scan, 0 for portable, 1 for mobile units.

TEST MODE COMMANDS:

#	no function
1#	Restart (Re-enter DC power start-up routine.) On TDMA phones, this command has the same effect as pressing PWR button.
2#	Display Current Telephone Status (This is a non-altering version of the STATUS DISPLAY. On a 14 character display, all the information is shown. On a 7 character display only the information on the second line of a 14 character display is shown. On a 10 character display, all the information on the second line of a 14 character display plus the last three characters of the first line are shown.) STATUS DISPLAY, ALTERNATES BETWEEN: AAA BBB AAA = Channel Number (decimal) BBB = RSSI reading for channel CDEFGHI are as follows: •C = SAT frequency (0=5970, 1=6000, 2=6030, 3=no channel lock) •D = Carrier (0=off, 1=on) •E = Signaling tone (0=off, 1=on) •F = Power attenuation level (0 through 7) •G = Channel mode (0=voice channel, 1=control channel) •H = Receive audio mute (0=unmuted, 1=muted) •I = Transmit audio mute (0=unmuted, 1=muted) Press * to hold display and # to end.
3#	Reset Autonomous Timer. This command results in the reset of the autonomous timer but does not provide any test function on these models
4#	Initializes Telephone to Standard Default Conditions: Carrier Off, Power Level 0, Receiver Audio Muted, Transmit Audio Muted, Signaling Tone Off, SAT Off, Resetting of Watch-Dog Timer Enabled, DTMF and Audio Tones Off, Audio Path Set to Speaker
5#	TX Carrier On (Key Transmitter)
6#	TX Carrier Off
7#	RX Audio Off (Mute Receiver Audio)
8#	RX Audio On (Unmute Receiver Audio) NOTE: It seems Motorola finally discovered that people were using this command to eaves-drop on cellular converstions. On MOST of the newer phones (95xx and up), this command when used with 11xxxx# will only work with the following channels: 11xxxx# Tower Freq. Mobile Freq. Channel #300 Tx 879.00 Rx 834.00 0300 #333 Tx 879.99 Rx 834.99 0333 #385 Tx 881.55 Rx 836.55 0385 #799 Tx 893.97 Rx 848.97 0799 #991 Tx 869.04 Rx 824.04 0800
9#	TX Audio Off
10#	TX Audio On
11	(Ch.No.)# Set Transceiver to Channel xxxx (Receive and Transmit in Decimal; accepts 1, 2, 3, or 4 digits)
12y	x# Set Power Step to x; (0,1-7) 0=Maximum Power (3 Watts) 7=Minimum Power Out
13#	Power Off (Shuts off the radio)
14#	10 kHz Signaling Tone On
15#	10 kHz Signaling Tone Off
16#	Setup (Transmits a five word RECC message; each of the five words will be "FF00AA55CC33." Transmitter dekeys at the end of the message.)
17#	Voice (Transmits a two word REVC message; each of the two words will be "FF00AA55CC33." Transmitter de-keys at the end of the message.)
18#	C-Scan (Allows for entry of as many as 5 negative SID's for each NAM.) Newer Motorola phones are equipped with a feature called C-Scan, this is an option along with the standard A/B system selections. C-Scan allows the phone to be programmed with up to five inhibited system ID's per NAM.
	This is designed to prevent the phone from roaming onto specified non-home systems and therefore reduce "accidental" roaming fees. 1. C-Scan can only be programmed from test mode, power phone up with the relevant test mode contact grounded (see above). 2. Press # to access test mode 3. Press 18#, the phone will display "0 40000". 4. Enter the first inhibited system ID and press *. Continue to enter additional system ID's if required. After the 5th entry the phone will display "N2". Press * to continue and add system ID's for NAM 2 as required. 5. If an incorrect entry is made (outside the range of 00000-32767) the display will not advance, press CLR and re-enter. Use a setting of 40000 for any un-needed locations. 6. When the last entry has been made press * to store and press # to exit, turn off power.
or	[**Phones without the C-Scan option used this command to SEND NAM.**]
18#	SEND NAM. Display shows AA BB. Where AA=Address and BB=Data. Displays the contents of the NAM, one address at a time, advanced by pressing the * key. The following data is contained in NAM. The test is exited by depressing the # key. SIDH Sec. Code OPT. (1,2,&3) MIN MIN1, MIN2 FCHNA SCM FCHNB IPCH NDED ACCOLC CHKSUM GIM
19#	Display Software Version Number (yyww year and week)
	NOTE:Entering commands 20# through 23# or 27# causes the transceiver to begin a counting sequence or continuous transmission as described below. In order to exit from the commands to enter another test command, the # key must be depressed; all other key depressions are ignored.
20#	Receive control channel messages counting correctable and uncorrectable errors. When the command starts, the number of the command will be displayed in the upper-right corner of the display. Entering a # key will terminate the command and display two three-digit numbers in the display. The first number is the number of correctable errors and the second is the uncorrectable errors.
21#	Received voice channel messages counting correctable and uncorrectable errors. When the command starts, the number of the command will be displayed in the upper right-hand corner of the display. Entering a # key terminates the command and will display two three-digit numbers in the display. The first is the number of correctable errors and the second is the uncorrectable errors.
22#	Receive control channel messages counting word sync sequence. When the command starts, the number of the command will be displayed in the upper right-hand corner of the display. Entering a # key will terminate the command and display the number of word sync sequences in the display.
23#	Receive voice channel messages counting word sync sequences. When the command starts, the number of the command will be displayed in the upper right-hand corner of the display. Entering a # key will terminate the command and display the number of word sync sequences in the display.
24#	Receive control channel data and display the majority voted busy/idle bit. 0=idle 1=busy
25	x# SAT On When x=0, SAT=5970HZ x=1, SAT=6000HZ x=2, SAT=6030HZ
26#	SAT Off

27#	Transmit Data (Transmits continuous control channel data. All words will be "FF00AA55CC33." When the command starts, '27' will be displayed in the right side of the display. Entering a # key will terminate the command. The transmitter de-keys when finished.)
28#	Activate the high tone (1150 Hz +/- 55 Hz)
29#	De-activate the high tone
30#	Activate the low tone (770 Hz +/- 40 Hz)
31#	De-activate the low tone
32#	Clear (Sets non-volatile memory to zeroes or factory default. This command will affect all counters, all repertory memory including the last number called stack, and all user programmable features including the setting of System Registration. It does not affect the ESN, NAM, phasing data, or lock code. This takes a minute or so. DO NOT TURN OFF THE TELEPHONE WHILE THIS IS SHOWING '32' ON THE DISPLAY. WAIT UNTIL THE NORMAL SERVICE LEVEL DISPLAY RESUMES!)
33	x# Turn on DTMF for x (1-9, *, 0, #, plus the single tones) where x= 1 697 Hz + 1209 Hz 10 697 Hz 2 697 Hz + 1336 Hz 11 770 Hz 3 697 Hz + 1477 Hz 12 852 Hz 4 770 Hz + 1209 Hz 13 941 Hz 5 770 Hz + 1336 Hz 14 1150 Hz (not used in cellular) 6 770 Hz + 1477 Hz 15 1209 Hz 7 852 Hz + 1209 Hz 16 1336 Hz 8 852 Hz + 1336 Hz 17 1477 Hz 9 852 Hz + 1477 Hz 18 1633 Hz (not used in cellular) * 941 Hz + 1209 Hz 0 941 Hz + 1336 Hz # 941 Hz + 1477 Hz
34#	Turn DTMF Off
35#	Display RSSI ("D" Series Portable Only)
	or
35	x# Set Audio Path to x x=0, V.S.P Microphone (Applies to mobiles only.) x=1, Speaker x=2, Alert x=3, Handset x=4, Mute x=5, External Telephone (Applies to Portables Only) x=6, External Handset (Applies to NEWER Portables)
36	nnn# Scan (TDMA Telephones only. Scans the primary control channels and attempts to decipher the forward data stream. The display will show PASS1 if the strongest control channel was accessed, PASS2 if the second strongest was accessed, and FAIL if no control channel could be accessed.) (nnn=Scan speed in milliseconds). Tunes from channel 1 to 666 in order. Entering a * pauses the scan and displays current Channel Number and RSSI reading AAA=Channel Number and BBB=RSSI Reading). When scan speed is 300 milliseconds or greater, the current status is displayed during the scan; when less than 300 milliseconds the status is displayed only during pause. Entering * during a pause causes the scan to resume. Entering #aborts the scan and leaves the mobile tuned to the current channel. During this command only the * and # keys are recognized.
37#	Sets Low Battery Threshold. Usage: #37#x# where x is any number from 1 to 255. If set to 1, the Low Battery indicator will come up when the phone is powered on. If set to 255, it may never come up.
38#	Display ESN (Displays ESN in four steps, two hexadecimal digits at a time in a for digit display. The decimal shows the address, 00 through 03 as the first two digits, and two digits of the ESN as the last two digits. Use the 'G' to step through the entire hexadecimal ESN.) Compander OFF ("D" Series Portables)
	or
	SND-SNM. Display shows AA BB. Where AA=Address;BB=Data. Send the SNM to the display. All 32 bytes of the SNM will be displayed, one byte at a time. The byte address will be displayed in the upper right-hand corner and the contents of that address will be displayed in the hex. The * key is used to step through the address similar to the SEND-NAM (18#) command.
39#	Compander ON ("D" Series Portables)
	or
39#	RCVSU. Receive one control channel word. When the word is received it is displayed in hex. This command will be complete when a control channel word is received or when the # key is entered to abort the command.
40#	RCVVC. Receive one voice channel word. When the word is received it is displayed in hex. This command will be complete when a voice channel word is received or when the # key is entered to abort the command.
41#	Enables Diversity (On F19CTA... Series only.)
42#	Disables Diversity (On F19CTA... Series only.)
43#	Disable Diversity USE T/R ANTENNA (On F19CTA... Series only.) USE R ANTENNA (On D.M.T./ Mini TAC)
44#	Disable Diversity USE R ANTENNA (On F19CTA... Series only.) USE T/R ANTENNA (On D.M.T./ Mini TAC)
45#	Display Current RSSI (Displayed as a three-digit decimal number)
46#	Display Cumulative Call Timer
47	x# Set RX Audio level to X (For F19CTA ...Series Transceivers) X=0, Lowest Volume X=6, Highest Volume X=7, mute Normal setting is 4. (For D.M.T./ Mini TAC Transceivers) X=0, Lowest Volume X=7, Highest Volume Normal setting is 4. (For TDMA Transceivers and F09F... Series and Higher Portables) X=0, Lowest Volume X=15, Highest Volume Normal setting is 2 to 4. (On TDMA Transceivers and Micro TAC portables, settings 8 through 15 are for DTMF applications only.)
48#	Side Tone On. Use this command in conjunction with 350# to test the entire audio path in hands-free applications
49#	Side Tone Off
50#	Maintenance data is transmitted and test results displayed: •PASS=received data is correct •FAIL 1=2second timeout, no data rec. •FAIL 2=received data is incorrect
51#	Test of mobile where maintenance data is transmitted and looped back. Display is as follows: •PASS=looped-back data is correct •FAIL 1=2 second timeout, no looped-back data •FAIL 2=looped-back data is incorrect
52	x# SAT Phase Adjustment. A decimal value that corresponds to phase shift compensation in 4.5 degree increments. Compensation added to inherent phase shift in transceiver to achieve a total of 0 degrees phase shift. Do NOT enter any values except those shown below. 0 degrees = 0 121.5 degrees = 59 243.0 degrees = 86 4.5 = 1 126.0 = 60 247.5 = 87 9.0 = 2 130.5 = 61 252.0 = 112 13.5 = 3 135.0 = 62 256.5 = 113 18.0 = 4 139.5 = 63 261.0 = 114 22.5 = 5 144.0 = 40 265.5 = 115 27.0 = 6 148.5 = 41 270.0 = 116 31.5 = 7 153.0 = 42 274.5 = 117 36.0 = 16 157.5 = 43 279.0 = 118 40.5 = 17 162.0 = 44 283.5 = 119 45.0 = 18 166.5 = 45 288.0 = 120 49.5 = 19 171.0 = 46 292.5 = 121 54.0 = 20 175.5 = 47 297.0 = 122 58.5 = 21 180.0 = 64 301.5 = 123

	63.0 = 22 184.5 = 65 306.0 = 124 67.5 = 23 189.0 = 66 310.5 = 125 72.0 = 48 193.5 = 67 315.0 = 126 76.5 = 49 198.0 = 68 319.5 = 127 81.0 = 50 202.5 = 69 324.0 = 104 85.5 = 51 207.0 = 70 328.5 = 105 90.0 = 52 211.5 = 71 333.0 = 106 94.5 = 53 216.0 = 80 337.5 = 107 99.0 = 54 220.5 = 81 342.0 = 108 103.5 = 55 225.0 = 82 346.5 = 109 108.0 = 56 229.5 = 83 351.0 = 110 112.5 = 57 234.0 = 84 355.5 = 111 117.0 = 58 238.5 = 85 360.0 = 70
53#	Enable scrambler option, when equipped
54#	Disable scrambler option, when equipped.
55#	Display/Program N.A.M. (see Test Mode Programming)
56#	Illumination Diagnostic. Lights up all lights (except the green in use light) and displays all "8"'s. The phone is also muted until repowered.
57	x# Call Processing Mode x=0, AMPS x=1, NAMPS x=2-4, RESERVED x=5, TDMA signaling x=6, TDMA signaling with loopback before decoding x=7, TDMA signaling with loopback voice after decoding x=8, TDMA signaling with loopback FACCH after decoding x=9, TDMA forced synchronization
58#	Compander On (Audio compressor and expander) (See

59#	Compander Off (Audio compressor and expander) (See 38#)
60#	no function
61#	ESN Transfer (For Series I D.M.T./Mini TAC only)
62#	Turn On Ringer Audio Path
63#	Turn Off Ringer Audio Path
64#	no function
65#	no function
66#	66# Identity Transfer (Series II Transceivers and some Current Shipping Portables)
67#	no function
68#	Display FLEX and Model Information
69#	Used with Identity Transfer
70#	Abbreviated field transmitter audio deviation command, for transceivers with FCC ID ABZ89FT5668.
71#	Abbreviated field power adjustment command, for transceivers with FCC ID ABZ89FT5668.
72#	Field audio phasing commands
73#	Field power adjustment command.
80x #	Current Identity Transfer Procedure. (Available in telephones shipping after April 1, 1995.) This does NOT transfer the ESN. x=0, Transfers NAM information (On TDMA telephones, this command also transfers C-Scan SID's.) x=1, Transfers repertory memory (names & telephone numbers in memory.) x=2, Transfers C-Scan SID's on analog telephones (Not available on TDMA telephones.)

GSM Info and Test Modes.

Thanks to Janus Krarup (jckrarup@post1.com http://www.ibt.dk/morten/friends/) for all the information in this section. His web page has all of this information (and more) and is continually updated. It's also offered in Italian and will be available soon in Czech.

TESTMODE for GSM PHONES:

Start with the sequence:
Testmode Command#
[pause] [pause] [pause] [1] [1] [3] [pause] [1] [pause] [ok] [MENU] (pause is accomplished by holding down the [*] key until box appears).
This accomplishes the editing/viewing of the Engineer Field Options. By substituting different numbers for the [1] [1] [3], many more test mode commands and functions are available. (see below for an almost complete list)
After pressing [MENU], scroll until the new option appears. Pressing [OK] will then reveal 3 new options:

ACTIVE CELL:
Displays Active Channel and lets you scroll through: RxLev, RxLevAM, NCC, BCC, MSTxPwr, and C1.
During a call you can see: RxLev, RxLevFull, RxLevSub, RxQualFul, RxQualSub, Timeslot, TimeAdv, and PwrLev.
The active channel may read "Hopping" during a call.
When establishing a network connection you can see what SDCCH (Standalone Dedicated Control CHannel) the negotiation takes place on.

ADJACENT CELLS:
Lets you scroll through the adjacent cells (1-6) and view their channel allocations.

SYSTEM PARAMETERS:
Displays the following: Combined, AcsClas, MCC, MNC, LAC, CellID, T3212, BS-PA-MFRM, and XZQTY.
During a call you can see: Combined, DTX, MCC, MNC, LAC, and CellID.
Key To The Readouts:

Combined:	Haven't got a clue. The two Danish operators has OFF and Swedish Comviq has ON.

RxLev:	The strength of the received signal (in dBm), normally between -55 and -90 - the signal drops at RxLevAm
	When comparing RxLev's, remember the logarithmic nature of the dB scale and that the signal intensity decays by a factor of 4 when the distance from the BST is doubled (assuming line of sight to the BST, the signal will drop 6 db when the distance is doubled.)
RxLevAm:	Receive signal strength cut off point (around -100 dBm and -110 dBm).
BCC:	Broadcast Color Code (0 through 7)
NCC:	Network Color Code (0 through 7)
MSTxPwr:	BTS transmit power in dBm (see notes on power control)
C1:	Measurement of the signal quality (bit failure). A forced handoff will be made if C1<0. (I have seen C1 as high as 039). This value is reported from MS back to the BSC which decides when to make a handoff.
RxLevFull:	C1 value with continuous transmission from tower.
RxLevSub:	C1 value with discontinuous transmission from tower.
RxQualFull:	Bit error rate with continuous transmission from tower.
RxQualSub:	Bit error rate with discontinuous transmission from tower.
Timeslot:	The current timeslot (0 through 7). TDMA allows eight channels to be accommodated on a single RF carrier.
TimeAdv:	Timing advance (0 through 63). TA can be multiplied with 547 meters (35 km/64 TA steps) to get the distance to the BTS.
PwrLev:	Shows which power step/level the phone is transmitting at (see section below on power control)
DTX:	Discontinuous transmission, a feature used to save battery and reduce network traffic.
MCC:	Mobile Country Code. 238=Denmark
MNC:	Mobile Network Code. 1=Tele Denmark, 2=Sonofon (these are the ones for the MCC 238).
LAC:	Local Area Code. (not sure, but I could imagine it being the BSC identity).
CellID:	A unique number that identifies the cell. (BTS identity)
T3212:	Time between periodic network updates. Appears to be fixed (010 for Tele Denmark and 050 for Sonofon).

POWER CONTROL:
To minimize co-channel interference and to conserve power, both the mobiles and the Base Transceiver Stations operate at the lowest power level that will maintain an acceptable signal quality. Power levels can be stepped up or down in steps of 2 db from the peak power for the class down to a minimum of 13 dBm (20 milliwatts).

Use this table to translate between dBm, PwrLev, and Power:

Power Level	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
dBm	43	41	39	37	35	33	31	29	27	25	23	21	19	17	15	13
Watts	16	12.8	8	5.2	3.2	2	1.3	0.8	0.5	0.32	0.2	0.13	0.08	0.05	0.03	0.02

If you can help out with deciphering the readouts, additional sequences or corrections please feel free to contact Janus Krarup at jckrarup@post1.com.

Security Codes on the GSM phones:

The phones are protected by two codes:
The UNLOCK code which consists of 4 digits (default 1234)
This is changed by typing MENU 51 and providing the security code. You can type in wrong codes until you hit the right one.
The SECURITY code which consists of 6 digits (default 000000)
This is changed by typing MENU 54 and providing the old code. Again, you can keep hitting bogus codes all day until you get the right one (hope you got some time to kill).

The SIM card is protected by 2 codes:
The PIN code (Personal Identification Number) which consists of 4 to 8 digits.
The PIN code can only be typed in wrong 3 times (you heard right...3). After this the SIM card will be blocked until the PUK code is used. The PIN code is user definable. It can be changed by providing the old PIN code or the PUK code. There is a menu for changing the PIN code by providing the old one, but you can also type **04* in order to do so. To enter a whole new PIN on a blocked card or without knowing the old PIN, you need to use **05* PUK (OK) NEWPIN (OK) NEWPIN (OK)
The PUK code (Personal Unblocking Key) consists of 8 digits.
This is set by the network provider and can not be changed. If entered wrongly 10 times, the card will become permanently blocked and will need to be replaced.

Undocumented Menu shortcuts (7500, 8200, and maybe the 5200 and 7200)

Menu + XX

11	Status Review
13	Available networks
14	Preferred networks
21	Incoming call alert
22	Select keypad tones
25	Require SIM card PIN
26	Language selection
32	Repetitive timer
33	Single alert timer
34	Show meter during calls
35	Resettable call meters
36	Resettable call meters

37	Set call cost rates
38	Reset all meters
41	Keypad dialing (call restrictions)
43	Restrict incoming calls
44	Phone number length
51	Change unlock code
52	Master reset
53	Master clear
54	New security code
55	Automatic lock
63	Battery saving mode

Test Mode Functions:

3	MENU-phone book
4	MENU-messages
5	mute on/off (menu during call)
6	MENU-Call related features
7	MENU-"arrows"
8	select phone line
9	last ten calls•
10	restrict my phone number
11	call diverting
12	divert when available
13	Detailed diverting
14	Divert voice calls
15	Divert ALL voice calls
16	If Busy
17	If no answer
18	If not reachable
19	Divert fax calls
20	Divert Data calls
21	Cancel all diverting
22	Call waiting
23	Call barring
24	Bar outgoing calls
25	Bar incoming calls
26	Change Barr password
27	Call restrictions
28	Restrict incoming calls
29	Phone number length
30	Keypad dialing
31	Call voicemail
32	Received messages
33	Cell broadcast
34	Message settings
35	Message alert tone
36	Voicemail number
37	Incoming call alert
38	No alert
39	Vibrate only
40	Adjust ring volume
41	Lock now
42	Automatic lock
43	Change unlock code
44	Require SIM card PIN
45	Change SIM PIN code
46	New security code
47	Extended menus
48	Language selection
49	Automatic (Language Selection)
50	Change greeting
51	Battery saving mode
52	Select keypad tones
53	Phone status
54	Status review
55	Master reset
56	Master clear
57	Available networks

58	Network search
59	Registration preferences
60	Frequency of search•
61	Preferred networks
62	Add network to list
63	Show list of networks
64	Find new network
65	Show last call
66	Resettable call timers
67	Set audible call timers
68	Single alert timers
69	Repetitive timer
70	**1 = register write lock!!!•
71	Show meter during calls
72	Set meter format
73	Set call cost rates
74	Lifetime meter
81	Find entry by name
82	Find entry by location
83	Show services
84	Enter my phone number
85	Show my phone number
86	Add entry
87	Check phone capacity
88	Check SIM capacity
89	Prevent access
90	Edit name (my phone number)
91	Edit number (my phone number)
92	MENU - Call related features
93	MENU - Phone setup
94	MENU - Network selection
95	MENU - Call meters
99	Periodic search
100	Continuous search
101	Slow search
102	Medium search
103	Fast search
104	MENU - Phonebook
105	MENU - Phonebook
106	MENU - Messages
107	MENU - Messages
108	Copy SIM memory
110	Edit number (direct dial key)
111	Edit name (direct dial key)
112	Direct dial key
113	MENU - Eng Field Options
126	erase all numbers (last 10)

HACKING THE FOVC

Problem: When listening to something interesting (a conversation), just when that sexy sounding horny broad begins to give her phone number to some lucky guy, HANDOFF!!! then static... DAMN!
Trick: Hack the FOVC.

FOVC	FOward Voice Channel
FOCC	FOward Control Channel
REVC	REverse Voice Channel
RECC	REverse Control Channel

As the phone travels through cells, the FOVC is where the tower tells the phone to adjust power levels for the current cell or to change to a new channel for use in the new cell. This info can be hacked apart. So. When you've found a good conversation, don't be lazy! Enter 40#! This makes the phone listen for commands on the voice channel (embedded in the audio portion- you can hear it as a "bump" sound). It will just sit there and the display will read '40' , but the conversation will still be audible. Now when the phone receives a FOVC command (a 40 bit sequence) data will flow across the display, in hex format, and stop. Listen to the phone, if the conversation is still there, then the command was only to adjust power levels. If the conversation is gone, then its a handoff. If you only got a power adjustment command just press # or clr, which ever gets you back to the ' prompt. Enter 40# and keep listening. You can also use the # key to cancel the 40# command, if you want to change channels or something.

If it was a handoff, its time for some quick math. You have to convert some of the numbers to binary, and then to decimal. I don't know how many characters your phone's display will show. Mine only shows the last seven of the ten hex digits. Count left from the end 6 digits. Write down that digit and the next two on a piece of paper, ie:

```
???j16djjj          j=junk numbers (hex numbers range from 0-9,a-f)
 ⇑
these are lost due to scrolling
```

write down 16d then convert it to a binary string:

1 = 0001
6 = 0110
d = 1101 (d=13)

now you have a binary string like this:	000101101101
throw away the first 2 bits and get:	0101101101
convert this to decimal and get:	365

365 is the new channel the conversation has moved to! Enter 110365# and viola! You too, can hear the horny babe's phone number!

Don't forget to enter 40# again, as the call may be moving quickly through cells (small cells or freeway driving) or the call can get bounced around by the tower for cell traffic purposes.

Here's one more example of the hex>binary>decimal conversion.

???j5aejjj
5 = 0101
a = 1010
e = 1110

full string	010110101110
truncate 2 msb	0110101110
convert to decimal	430

Assembling a _QUALITY_ Motorola Flip programming cable

from a standard battery eliminator.
Written by KG/Control Team/Umf 02/07/94

Word. It seems that alot of bad cables are being sold by some lame asses here on the west coast. The result, alot of _rare_ LO phonez are being fried. Welp, this file should clear things up. Even if you've never made anything but clay pots this should be easy for ya. Take your time and this, along with your phone will last a lifetime...

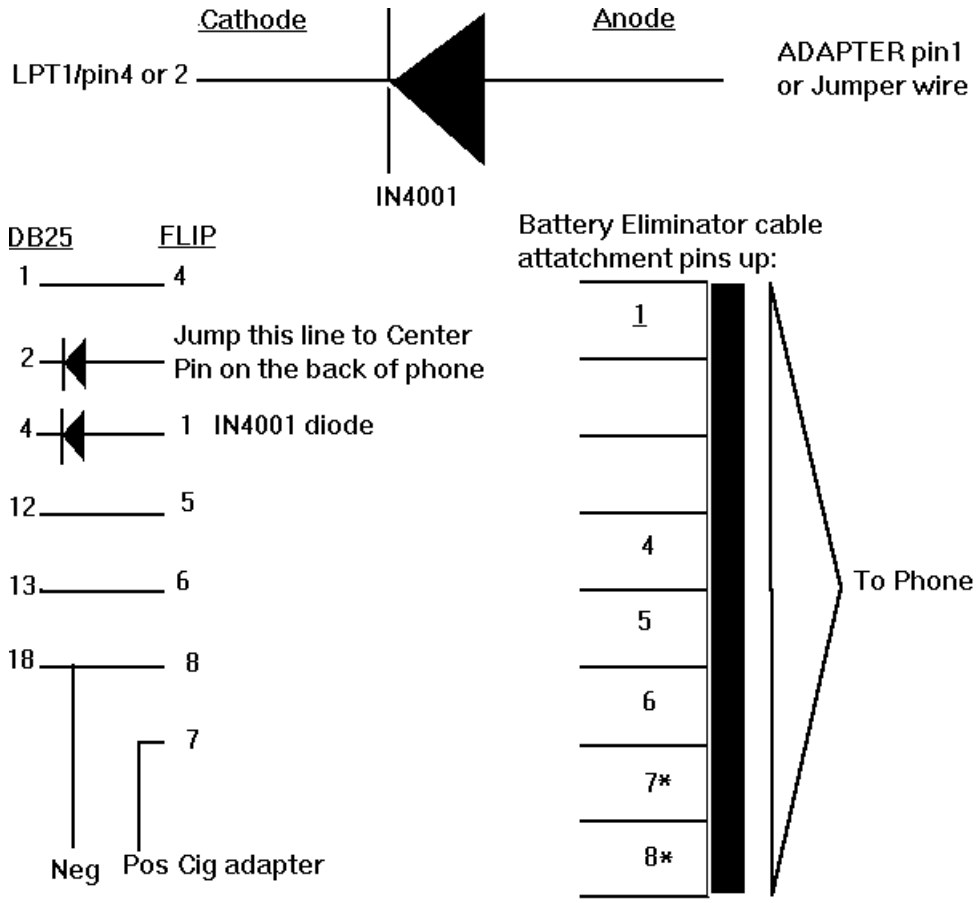
Parts:	(1) 550 Battery Eliminator
	(2) IN4001 Diodes
	(1) Head pins(single row straight stick headers)
	(1) DB25/RS232 Connector for connection to LPT1
	(1) METAL DB25 cover/protector
	(1) 1 1/2 foot of 5 line ribbon
	(1) jumper wire (be creative)
Tools:	Scissors (I like scissors for splicing wires)
	Soldering Iron
	Hot glue gun (borrow mom's)
	Exacto knife (optional)
	DMM w/continuity

I'll try and be as verbose as possible. All references to the plastic part that connects the phone to the cable will be known here as the ADAPTER. The hardest thing to find, at least in where I am, is a battery eliminator that has all 8 pins on the ADAPTER. So if ya do have a cable with all the pins you can skip this paragraph. What I did was to go ahead and shell out the 35 duckets for a battery eliminator that only had pin's 7 & 8 (power) on the ADAPTER. Go to you local electronics shop and pick up a pack of head pins. These puppies are the EXACT same thing as what's in the ADAPTER, 'cept their nickel instead of copper. Cut 4 of them off the plastic but be careful not to bend them when you do so.

Carefully pry off the cover of the ADAPTER and use the exacto knife to get the pins and attached wires out of the cover. Otherwise you'll end up melting the cover, and trashing the project. Now de-solder the wires connected to pins 7 & 8, wrap then with 2 of the ribbon's leads then re-solder them back to the same pins. Once again, be careful not to bend them. Now solder the other 4 ribbon lead to the pins 1, 4-6. Now carefully put each pin back into the ADAPTER cover, if some of the holes are filled with resin (batt eliminator), simply push an _extra_ bridge pin thru to get that shit out! Make a note of their colors, then take the DMM and go over all the connections, making sure that no pin one pin on the ADAPTER is _touching another: 1-4, 2-8, 4-6 ect... * note that pins 7 & 8 will show values from due to the voltage regulator inside the ciggy plug.

Fire up that hot glue gun and place some on the cover to make sure those pins/ wires / solder don't move around when ya put the ADAPTER back together. Don't put too much on or you wont be able to close it. Wait a min or 2 until that dries, then throw some glue into the ADAPTER and quickly close it up.

As for the DB25 you shouldn't have any trouble. Just make sure you solder the Diode to the wire before soldering it the port. Remember parallel pin specs are not the same as serial!!



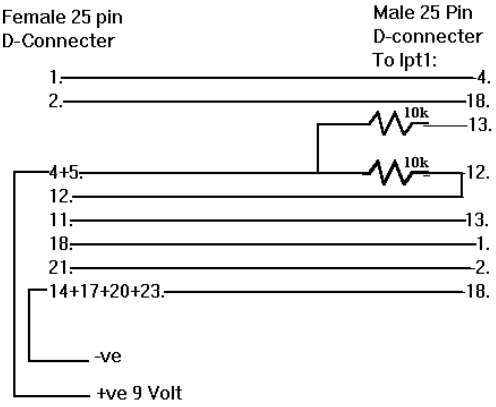
This cable will work with the 6.6, 9.11 & 9.9 software. This means that without a) AMPS or b) The Trick Clip you'll need to find a Flip that has a firmware revision equal to or below 9122. A good sign that the phone is indeed a LO, is to check the ESN located on the back and look for any prefix below A2A. If you can't locate the ESN sticker, usually cause it's stolen, then look for a MCsquared printed along with the menu sticker. If the phone has the MC2 don't buy it. If the phone doesn't have the menu sticker don't buy it! Also before you fork over the $$$ make sure that all the ports on the phone are in good condition.

Some people may experience problems with 486 machines. I'm looking into slowing the shit down in order for the phone to respond. One way is to divide your BIOS bus clock by 6, another is to load a TSR that actually slows your CPU, although I haven't yet found this to work for me. 286-386 processors work fine. Short cables are a must!

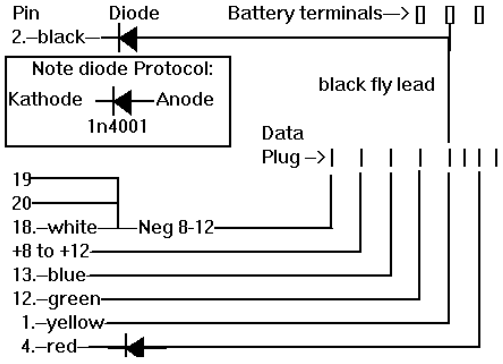
From: locke@dfw.net
Date: Thu, 20 Oct 1994 09:53:54 GMT (altered Thu, 23 Mar 1995)

Anyway, I hope this helps, you CANNOT program the phones without twisting/connecting the additional 19 & 20 DB25 connections.

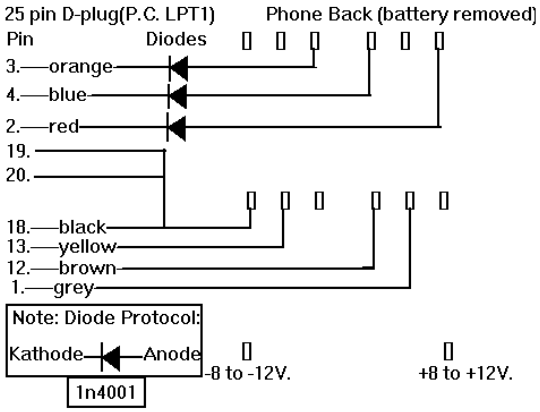
Motorola Transcivers
4500x, 4800x, 6800x, Etc.



Motorola 9800x Personal Tac1 etc. (brick)



Motorola 8500x 8800x (brick)



Final Note:

I HAVE NEVER TESTED ANY OF THESE CABLE SPECS!!! I REPEAT, I HAVE NEVER TRIED ANY OF THESE CABLE SPECS! THE USE OF THESE CABLES COULD DESTROY YOUR PHONE IF THE CABLES ARE MADE INCORRECTLY.
Wether these specs are good or bad is news to me. So if someone could e-mail me to let me know one way or another I would be REALLY obliged. The reason I have never tried these is because I HAVE NO DAMN softwear to use them with. Someone UUENCODE a copy of the newest Motorola softwear to me (unless it is that crap floating around that only changes shit that you could do with the above commands. ESN changing software is what I need.) Anyone with experience in disassembling Motorola's software should e-mail me. We need to get Together.

Mike.Larsen@uit.com
Stularsenmic@vax.colsf.edu

Pinouts for Motorola 8000 “brick” phone - “N” series

numbering starts on top row left

pin	Signal
1	logic ground
2	not used
3	audio in to phone
4	audio out (and on/off toggle)
5	4.75 Bias
6	Manual test line

7	Ground for audio signals (common)
8	TRU data line
9	not used
10	CMP data line
11	RTN data line
12	ignition sense

15 pin cable pinouts

PIN	DESIGNATION/FUNCTION
1	Battery A+, red wire
2	Transmit Audio / ON-OFF Function, a shared line between Audio (AC) and ground. This line will toggle the ON/OFF status of the telephone.
3	Ground (A+ return), black wire
4	Ignition Sense Lead, green with a black tracer
5	Receiver Audio (RX High), to handset connector pin 8
6	Regulated +9.5 volts, to handset connector pin 2
7	T-Data, one of the 3-wire bus lines, to handset connector pin 3
8	C-Data, one of the 3-wire bus lines, to handset connector pin 4
9	Digital Hands-Free Microphone / Manual Test. When the pin is grounded, which can be done by shorting the two connectors of the Hands-Free microphone, the unit is enabled to work in TEST MODE.
10	R-Data, one of the 3-wire bus lines, to handset connector pin 5
11	Handset Logic Ground, to handset connector pin 1
12	Speaker High \ Only on SKN4279A and SKN4277A
13	Speaker Low /
14	Handset Audio Ground, to handset connector pin 6
15	Auxiliary Alert, yellow lead with a black tracer, used to blow the horn or flash the headlights. Provides a ground for the relay; maximum current is 1/2 amp. It is *N O T* recommended that this circuit be used to drive the horn or headlights directly.

OEM 32 pin cable pinouts

16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

+----------+

Note: Looking into connector C |* * * * * * * * * * * * * * * *|

on the transceiver with the D |* * * * * * * * * * * * * * * *|

antenna port down. +----------+

Pin#	Designation/Function Row C	Pin#	Designation/Function Row D
1	Battery A+	1	Not Used
2	Ignition Sense	2	Antenna Drive (for power antenna)
3	Status Display Control	3	Not Used
4	Not Used	4	Auxiliary Alert, used to blow the horn or flash the headlights through a relay
5	Ground (A+ Return)	5	Not Used
6	GM Proprietary Serial Data Bus	6	GM proprietary serial bus
7	Audio Ground, from GM Audio bus to telephone	7	Audio Ground (not connected)
8	Low level audio, from telephone to GM Audio bus	8	Low Level Audio (not used)
9	Not used	9	Manual Test Line; when grounded this line enables TEST MODE
10	Not used	10	RX High
11	Mobile / Transportable select line	11	Ground (TX Shield)
12	Handset Logic Ground	12	Regulated +9.5 volts
13	T-Data, one of the 3-wire bus lines	13	C-Data, one of the 3-wire bus lines
14	R-Data, one of the 3-wire bus lines	14	Audio Ground
15	TX High / ON-OFF	15	Ground (Rx Shield)
16	VSP Microphone High	16	VSP Microphone Ground

CVC BLOCK

[1] [2] [3] [4] [5] [6]

[7] [8] [9] [10] [11] [12]

1	VSP Enable	7	GROUND
2	SPKR Enable	8	S TRU
3	TX HI on/off	9	AUX Alert
4	RX HI	10	SCMP
5	RX HI OPT	11	S RTN
6	MAN TEST	12	IGN

New External Connector for the Ultra Classic II CVC Pinblocks

Pin	Designation/Function
1	Regulated 8 volts
3	ext. switched A+ enable
5	ext. spkr/mic enable
7	TX hi - on/off
9	T Data

11	R Data
2	Audio Ground
4	manual test
6	ignition / charger B+
8	RX hi
10	C Data
12	logic ground

Pinouts for Motorola series 2 and 3 transceivers 25 pin cable pin definitions

Pin	Designation/Function
1	Transmit Audio / ON - OFF Function
2	Mobile / Transportable Select line
3	Ground (A+ return), one of 2 black wires. Both are required for proper operation
4	Battery A+, one of 2 red wires. Both are required for proper operation.
5	Ignition Sense Lead, green with a black tracer
6	Receiver Audio to handset (RX High), pin 8 on the handset connector
7	Ground
8	Regulated +9.5 volts to handset, pin 2 on handset connector
9	Ground
10	Auxiliary Alert, yellow with black tracer, used to blow the horn or flash the headlights. Provides a ground function. NOTE: 1/2 amps maximum current. The recommended method is to drive a relay (e.q. MOT 59K813674). Ignition Sense, pin 5, must be low for this function to work.
11	T-Data, one of the 3-wire bus lines, to pin 3 of the handset connector.
12	C-Data, one of the 3-wire bus lines, to pin 4 of the handset connector.
13	Ground
14	Transmit Audio Shield
15	Transmit Audio

16	Battery A+, one of two red wires. Both are required for proper operation.
17	Ground, one of two black wires. Both are required for proper operation.
18	R-Data, one of the 3-wire bus lines, to pin 5 of the handset connector.
19.	Receiver Audio to External Speaker
20	Ground for Receiver Audio (Shield) to External Speaker.
21	Manual Test Line. When tied low places the telephone in TEST MODE.
22	Ground
23	Handset Logic Ground, to handset connector pin 1
24	Handset Audio Ground, to handset connector pin 6
25.	Accessory Ground, to External Speaker

Flip Fones and all fones using the dpc/pt flip cable

1 2 3 4 5 6 7 8 + G -
| | | | | | | | | | |
(looking at back of phone with battery removed)

Pin	Function
1	Logic Ground
2	Ext. 7.5V
3	TRU
4	CMP
5	RTN
6	Audio Ground
7	RX Audio OUT (spkr) (on/off)
8	TX Audio IN (mic)

Motorola / AMPS handset specifications:

RJ-45	DB-25	Description
1	23	ground
2	8	9.5v
3	11	3-wire databus “true”
4	12	complimentary line
5	18	return data line
6	24	audio ground
7	1	Tx Audio
8	6	Rx Audio

Motorola ESN ranges

The range of ESN numbers may be used to identify the type of Motorola Fone.

From	To	Type
8200 0000	827F FFFF	AMPS
8280 0000	829F FFFF	NAMPS (Narrow AMPS)
82A0 0000	82DF FFFF	AMPS
82E0 0000	82FF FFFF	TDMA
C300 0000	C37F FFFF	AMPS
C380 0000	C3BF FFFF	NAMPS

[Check with your system operator to verify your cellular switch is capable of operating with ESN's in all of these ranges. There have been situations in the past where the switch software was not updated to recognize the new ESN ranges, and customers were unable to complete phone calls as a result.]

Cellular Frequency List

Chan #	Tx Freq Mhz	Rx Freq Mhz	Chan #	Tx Freq Mhz	Rx Freq Mhz
1	870.03	825.03	334	880.02	835.02
2	870.06	825.06	335	880.05	835.05
3	870.09	825.09	336	880.08	835.08
4	870.12	825.12	337	880.11	835.11
5	870.15	825.15	338	880.14	835.14
6	870.18	825.18	339	880.17	835.17
7	870.21	825.21	340	880.20	835.20
8	870.24	825.24	341	880.23	835.23
9	870.27	825.27	342	880.26	835.26
10	870.30	825.30	343	880.29	835.29
11	870.33	825.33	344	880.32	835.32
12	870.36	825.36	345	880.35	835.35
13	870.39	825.39	346	880.38	835.38
14	870.42	825.42	347	880.41	835.41
15	870.45	825.45	348	880.44	835.44
16	870.48	825.48	349	880.47	835.47
17	870.51	825.51	350	880.50	835.50
18	870.54	825.54	351	880.53	835.53
19	870.57	825.57	352	880.56	835.56
20	870.60	825.60	353	880.59	835.59
21	870.63	825.63	354	880.62	835.62
22	870.66	825.66	355	880.65	835.65
23	870.69	825.69	356	880.68	835.68
24	870.72	825.72	357	880.71	835.71
25	870.75	825.75	358	880.74	835.74
26	870.78	825.78	359	880.77	835.77
27	870.81	825.81	360	880.80	835.80
28	870.84	825.84	361	880.83	835.83
29	870.87	825.87	362	880.86	835.86
30	870.90	825.90	363	880.89	835.89
31	870.93	825.93	364	880.92	835.92
32	870.96	825.96	365	880.95	835.95
33	870.99	825.99	366	880.98	835.98
34	871.02	826.02	367	881.01	836.01
35	871.05	826.05	368	881.04	836.04
36	871.08	826.08	369	881.07	836.07
37	871.11	826.11	370	881.10	836.10
38	871.14	826.14	371	881.13	836.13
39	871.17	826.17	372	881.16	836.16
40	871.20	826.20	373	881.19	836.19
41	871.23	826.23	374	881.22	836.22
42	871.26	826.26	375	881.25	836.25
43	871.29	826.29	376	881.28	836.28
44	871.32	826.32	377	881.31	836.31
45	871.35	826.35	378	881.34	836.34
46	871.38	826.38	379	881.37	836.37
47	871.41	826.41	380	881.40	836.40
48	871.44	826.44	381	881.43	836.43
49	871.47	826.47	382	881.46	836.46
50	871.50	826.50	383	881.49	836.49
51	871.53	826.53	384	881.52	836.52
52	871.56	826.56	385	881.55	836.55
53	871.59	826.59	386	881.58	836.58
54	871.62	826.62	387	881.61	836.61
55	871.65	826.65	388	881.64	836.64
56	871.68	826.68	389	881.67	836.67
57	871.71	826.71	390	881.70	836.70
58	871.74	826.74	391	881.73	836.73
59	871.77	826.77	392	881.76	836.76
60	871.80	826.80	393	881.79	836.79
61	871.83	826.83	394	881.82	836.82
62	871.86	826.86	395	881.85	836.85
63	871.89	826.89	396	881.88	836.88
64	871.92	826.92	397	881.91	836.91
65	871.95	826.95	398	881.94	836.94
66	871.98	826.98	399	881.97	836.97
67	872.01	827.01	400	882.00	837.00
68	872.04	827.04	401	882.03	837.03
69	872.07	827.07	402	882.06	837.06
70	872.10	827.10	403	882.09	837.09
71	872.13	827.13	404	882.12	837.12
72	872.16	827.16	405	882.15	837.15
73	872.19	827.19	406	882.18	837.18
74	872.22	827.22	407	882.21	837.21
75	872.25	827.25	408	882.24	837.24
76	872.28	827.28	409	882.27	837.27
77	872.31	827.31	410	882.30	837.30
78	872.34	827.34	411	882.33	837.33
79	872.37	827.37	412	882.36	837.36
80	872.40	827.40	413	882.39	837.39
81	872.43	827.43	414	882.42	837.42
82	872.46	827.46	415	882.45	837.45
83	872.49	827.49	416	882.48	837.48
84	872.52	827.52	417	882.51	837.51
85	872.55	827.55	418	882.54	837.54
86	872.58	827.58	419	882.57	837.57
87	872.61	827.61	420	882.60	837.60
88	872.64	827.64	421	882.63	837.63
89	872.67	827.67	422	882.66	837.66
90	872.70	827.70	423	882.69	837.69
91	872.73	827.73	424	882.72	837.72
92	872.76	827.76	425	882.75	837.75
93	872.79	827.79	426	882.78	837.78
94	872.82	827.82	427	882.81	837.81
95	872.85	827.85	428	882.84	837.84
96	872.88	827.88	429	882.87	837.87
97	872.91	827.91	430	882.90	837.90
98	872.94	827.94	431	882.93	837.93
99	872.97	827.97	432	882.96	837.96
100	873.00	828.00	433	882.99	837.99
101	873.03	828.03	434	883.02	838.02
102	873.06	828.06	435	883.05	838.05
103	873.09	828.09	436	883.08	838.08
104	873.12	828.12	437	883.11	838.11
105	873.15	828.15	438	883.14	838.14
106	873.18	828.18	439	883.17	838.17
107	873.21	828.21	440	883.20	838.20
108	873.24	828.24	441	883.23	838.23
109	873.27	828.27	442	883.26	838.26
110	873.30	828.30	443	883.29	838.29
111	873.33	828.33	444	883.32	838.32
112	873.36	828.36	445	883.35	838.35
113	873.39	828.39	446	883.38	838.38
114	873.42	828.42	447	883.41	838.41
115	873.45	828.45	448	883.44	838.44
116	873.48	828.48	449	883.47	838.47
117	873.51	828.51	450	883.50	838.50
118	873.54	828.54	451	883.53	838.53
119	873.57	828.57	452	883.56	838.56
120	873.60	828.60	453	883.59	838.59
121	873.63	828.63	454	883.62	838.62
122	873.66	828.66	455	883.65	838.65
123	873.69	828.69	456	883.68	838.68
124	873.72	828.72	457	883.71	838.71
125	873.75	828.75	458	883.74	838.74
126	873.78	828.78	459	883.77	838.77
127	873.81	828.81	460	883.80	838.80
128	873.84	828.84	461	883.83	838.83
129	873.87	828.87	462	883.86	838.86
130	873.90	828.90	463	883.89	838.89
131	873.93	828.93	464	883.92	838.92
132	873.96	828.96	465	883.95	838.95
133	873.99	828.99	466	883.98	838.98
134	874.02	829.02	467	884.01	839.01
135	874.05	829.05	468	884.04	839.04
136	874.08	829.08	469	884.07	839.07
137	874.11	829.11	470	884.10	839.10
138	874.14	829.14	471	884.13	839.13
139	874.17	829.17	472	884.16	839.16
140	874.20	829.20	473	884.19	839.19
141	874.23	829.23	474	884.22	839.22
142	874.26	829.26	475	884.25	839.25

143	874.29	829.29	476	884.28	839.28
144	874.32	829.32	477	884.31	839.31
145	874.35	829.35	478	884.34	839.34
146	874.38	829.38	479	884.37	839.37
147	874.41	829.41	480	884.40	839.40
148	874.44	829.44	481	884.43	839.43
149	874.47	829.47	482	884.46	839.46
150	874.50	829.50	483	884.49	839.49
151	874.53	829.53	484	884.52	839.52
152	874.56	829.56	485	884.55	839.55
153	874.59	829.59	486	884.58	839.58
154	874.62	829.62	487	884.61	839.61
155	874.65	829.65	488	884.64	839.64
156	874.68	829.68	489	884.67	839.67
157	874.71	829.71	490	884.70	839.70
158	874.74	829.74	491	884.73	839.73
159	874.77	829.77	492	884.76	839.76
160	874.80	829.80	493	884.79	839.79
161	874.83	829.83	494	884.82	839.82
162	874.86	829.86	495	884.85	839.85
163	874.89	829.89	496	884.88	839.88
164	874.92	829.92	497	884.91	839.91
165	874.95	829.95	498	884.94	839.94
166	874.98	829.98	499	884.97	839.97
167	875.01	830.01	500	885.00	840.00
168	875.04	830.04	501	885.03	840.03
169	875.07	830.07	502	885.06	840.06
170	875.10	830.10	503	885.09	840.09
171	875.13	830.13	504	885.12	840.12
172	875.16	830.16	505	885.15	840.15
173	875.19	830.19	506	885.18	840.18
174	875.22	830.22	507	885.21	840.21
175	875.25	830.25	508	885.24	840.24
176	875.28	830.28	509	885.27	840.27
177	875.31	830.31	510	885.30	840.30
178	875.34	830.34	511	885.33	840.33
179	875.37	830.37	512	885.36	840.36
180	875.40	830.40	513	885.39	840.39
181	875.43	830.43	514	885.42	840.42
182	875.46	830.46	515	885.45	840.45
183	875.49	830.49	516	885.48	840.48
184	875.52	830.52	517	885.51	840.51
185	875.55	830.55	518	885.54	840.54
186	875.58	830.58	519	885.57	840.57
187	875.61	830.61	520	885.60	840.60
188	875.64	830.64	521	885.63	840.63
189	875.67	830.67	522	885.66	840.66
190	875.70	830.70	523	885.69	840.69
191	875.73	830.73	524	885.72	840.72
192	875.76	830.76	525	885.75	840.75
193	875.79	830.79	526	885.78	840.78
194	875.82	830.82	527	885.81	840.81
195	875.85	830.85	528	885.84	840.84
196	875.88	830.88	529	885.87	840.87
197	875.91	830.91	530	885.90	840.90
198	875.94	830.94	531	885.93	840.93
199	875.97	830.97	532	885.96	840.96
200	876.00	831.00	533	885.99	840.99
201	876.03	831.03	534	886.02	841.02
202	876.06	831.06	535	886.05	841.05
203	876.09	831.09	536	886.08	841.08
204	876.12	831.12	537	886.11	841.11
205	876.15	831.15	538	886.14	841.14
206	876.18	831.18	539	886.17	841.17
207	876.21	831.21	540	886.20	841.20
208	876.24	831.24	541	886.23	841.23
209	876.27	831.27	542	886.26	841.26
210	876.30	831.30	543	886.29	841.29
211	876.33	831.33	544	886.32	841.32
212	876.36	831.36	545	886.35	841.35
213	876.39	831.39	546	886.38	841.38
214	876.42	831.42	547	886.41	841.41
215	876.45	831.45	548	886.44	841.44
216	876.48	831.48	549	886.47	841.47
217	876.51	831.51	550	886.50	841.50

218	876.54	831.54	551	886.53	841.53
219	876.57	831.57	552	886.56	841.56
220	876.60	831.60	553	886.59	841.59
221	876.63	831.63	554	886.62	841.62
222	876.66	831.66	555	886.65	841.65
223	876.69	831.69	556	886.68	841.68
224	876.72	831.72	557	886.71	841.71
225	876.75	831.75	558	886.74	841.74
226	876.78	831.78	559	886.77	841.77
227	876.81	831.81	560	886.80	841.80
228	876.84	831.84	561	886.83	841.83
229	876.87	831.87	562	886.86	841.86
230	876.90	831.90	563	886.89	841.89
231	876.93	831.93	564	886.92	841.92
232	876.96	831.96	565	886.95	841.95
233	876.99	831.99	566	886.98	841.98
234	877.02	832.02	567	887.01	842.01
235	877.05	832.05	568	887.04	842.04
236	877.08	832.08	569	887.07	842.07
237	877.11	832.11	570	887.10	842.10
238	877.14	832.14	571	887.13	842.13
239	877.17	832.17	572	887.16	842.16
240	877.20	832.20	573	887.19	842.19
241	877.23	832.23	574	887.22	842.22
242	877.26	832.26	575	887.25	842.25
243	877.29	832.29	576	887.28	842.28
244	877.32	832.32	577	887.31	842.31
245	877.35	832.35	578	887.34	842.34
246	877.38	832.38	579	887.37	842.37
247	877.41	832.41	580	887.40	842.40
248	877.44	832.44	581	887.43	842.43
249	877.47	832.47	582	887.46	842.46
250	877.50	832.50	583	887.49	842.49
251	877.53	832.53	584	887.52	842.52
252	877.56	832.56	585	887.55	842.55
253	877.59	832.59	586	887.58	842.58
254	877.62	832.62	587	887.61	842.61
255	877.65	832.65	588	887.64	842.64
256	877.68	832.68	589	887.67	842.67
257	877.71	832.71	590	887.70	842.70
258	877.74	832.74	591	887.73	842.73
259	877.77	832.77	592	887.76	842.76
260	877.80	832.80	593	887.79	842.79
261	877.83	832.83	594	887.82	842.82
262	877.86	832.86	595	887.85	842.85
263	877.89	832.89	596	887.88	842.88
264	877.92	832.92	597	887.91	842.91
265	877.95	832.95	598	887.94	842.94
266	877.98	832.98	599	887.97	842.97
267	878.01	833.01	600	888.00	843.00
268	878.04	833.04	601	888.03	843.03
269	878.07	833.07	602	888.06	843.06
270	878.10	833.10	603	888.09	843.09
271	878.13	833.13	604	888.12	843.12
272	878.16	833.16	605	888.15	843.15
273	878.19	833.19	606	888.18	843.18
274	878.22	833.22	607	888.21	843.21
275	878.25	833.25	608	888.24	843.24
276	878.28	833.28	609	888.27	843.27
277	878.31	833.31	610	888.30	843.30
278	878.34	833.34	611	888.33	843.33
279	878.37	833.37	612	888.36	843.36
280	878.40	833.40	613	888.39	843.39
281	878.43	833.43	614	888.42	843.42
282	878.46	833.46	615	888.45	843.45
283	878.49	833.49	616	888.48	843.48
284	878.52	833.52	617	888.51	843.51
285	878.55	833.55	618	888.54	843.54
286	878.58	833.58	619	888.57	843.57
287	878.61	833.61	620	888.60	843.60
288	878.64	833.64	621	888.63	843.63
289	878.67	833.67	622	888.66	843.66
290	878.70	833.70	623	888.69	843.69
291	878.73	833.73	624	888.72	843.72
292	878.76	833.76	625	888.75	843.75

293	878.79	833.79	626	888.78	843.78
294	878.82	833.82	627	888.81	843.81
295	878.85	833.85	628	888.84	843.84
296	878.88	833.88	629	888.87	843.87
297	878.91	833.91	630	888.90	843.90
298	878.94	833.94	631	888.93	843.93
299	878.97	833.97	632	888.96	843.96
300	879.00	834.00	633	888.99	843.99
301	879.03	834.03	634	889.02	844.02
302	879.06	834.06	635	889.05	844.05
303	879.09	834.09	636	889.08	844.08
304	879.12	834.12	637	889.11	844.11
305	879.15	834.15	638	889.14	844.14
306	879.18	834.18	639	889.17	844.17
307	879.21	834.21	640	889.20	844.20
308	879.24	834.24	641	889.23	844.23
309	879.27	834.27	642	889.26	844.26
310	879.30	834.30	643	889.29	844.29
311	879.33	834.33	644	889.32	844.32
312	879.36	834.36	645	889.35	844.35
313	879.39	834.39	646	889.38	844.38
314	879.42	834.42	647	889.41	844.41
315	879.45	834.45	648	889.44	844.44
316	879.48	834.48	649	889.47	844.47
317	879.51	834.51	650	889.50	844.50
318	879.54	834.54	651	889.53	844.53
319	879.57	834.57	652	889.56	844.56
320	879.60	834.60	653	889.59	844.59
321	879.63	834.63	654	889.62	844.62
322	879.66	834.66	655	889.65	844.65
323	879.69	834.69	656	889.68	844.68
324	879.72	834.72	657	889.71	844.71
325	879.75	834.75	658	889.74	844.74
326	879.78	834.78	659	889.77	844.77
327	879.81	834.81	660	889.80	844.80
328	879.84	834.84	661	889.83	844.83
329	879.87	834.87	662	889.86	844.86
330	879.90	834.90	663	889.89	844.89
331	879.93	834.93	664	889.92	844.92
332	879.96	834.96	665	889.95	844.95
333	879.99	834.99	666	889.98	844.98
667	890.01	845.01	717	891.51	846.51
668	890.04	845.04	718	891.54	846.54
669	890.07	845.07	719	891.57	846.57
670	890.10	845.10	720	891.60	846.60
671	890.13	845.13	721	891.63	846.63
672	890.16	845.16	722	891.66	846.66
673	890.19	845.19	723	891.69	846.69
674	890.22	845.22	724	891.72	846.72
675	890.25	845.25	725	891.75	846.75
676	890.28	845.28	726	891.78	846.78
677	890.31	845.31	727	891.81	846.81
678	890.34	845.34	728	891.84	846.84
679	890.37	845.37	729	891.87	846.87
680	890.40	845.40	730	891.90	846.90
681	890.43	845.43	731	891.93	846.93
682	890.46	845.46	732	891.96	846.96
683	890.49	845.49	733	891.99	846.99
684	890.52	845.52	734	892.02	847.02
685	890.55	845.55	735	892.05	847.05
686	890.58	845.58	736	892.08	847.08
687	890.61	845.61	737	892.11	847.11
688	890.64	845.64	738	892.14	847.14
689	890.67	845.67	739	892.17	847.17
690	890.70	845.70	740	892.20	847.20
691	890.73	845.73	741	892.23	847.23
692	890.76	845.76	742	892.26	847.26
693	890.79	845.79	743	892.29	847.29
694	890.82	845.82	744	892.32	847.32
695	890.85	845.85	745	892.35	847.35
696	890.88	845.88	746	892.38	847.38
697	890.91	845.91	747	892.41	847.41
698	890.94	845.94	748	892.44	847.44
699	890.97	845.97	749	892.47	847.47
700	891.00	846.00	750	892.50	847.50
701	891.03	846.03	751	892.53	847.53
702	891.06	846.06	752	892.56	847.56
703	891.09	846.09	753	892.59	847.59
704	891.12	846.12	754	892.62	847.62
705	891.15	846.15	755	892.65	847.65
706	891.18	846.18	756	892.68	847.68
707	891.21	846.21	757	892.71	847.71
708	891.24	846.24	758	892.74	847.74
709	891.27	846.27	759	892.77	847.77
710	891.30	846.30	760	892.80	847.80
711	891.33	846.33	761	892.83	847.83
712	891.36	846.36	762	892.86	847.86
713	891.39	846.39	763	892.89	847.89
714	891.42	846.42	764	892.92	847.92
715	891.45	846.45	765	892.95	847.95
716	891.48	846.48	766	892.98	847.98
991	869.04	824.04	767	893.01	848.01
992	869.07	824.07	768	893.04	848.04
993	869.10	824.10	769	893.07	848.07
994	869.13	824.13	770	893.10	848.10
995	869.16	824.16	771	893.13	848.13
996	869.19	824.19	772	893.16	848.16
997	869.22	824.22	773	893.19	848.19
998	869.25	824.25	774	893.22	848.22
999	869.28	824.28	775	893.25	848.25
1000	869.31	824.31	776	893.28	848.28
1001	869.34	824.34	777	893.31	848.31
1002	869.37	824.37	778	893.34	848.34
1003	869.40	824.40	779	893.37	848.37
1004	869.43	824.43	780	893.40	848.40
1005	869.46	824.46	781	893.43	848.43
1006	869.49	824.49	782	893.46	848.46
1007	869.52	824.52	783	893.49	848.49
1008	869.55	824.55	784	893.52	848.52
1009	869.58	824.58	785	893.55	848.55
1010	869.61	824.61	786	893.58	848.58
1011	869.64	824.64	787	893.61	848.61
1012	869.67	824.67	788	893.64	848.64
1013	869.70	824.70	789	893.67	848.67
1014	869.73	824.73	790	893.70	848.70
1015	869.76	824.76	791	893.73	848.73
1016	869.79	824.79	792	893.76	848.76
1017	869.82	824.82	793	893.79	848.79
1018	869.85	824.85	794	893.82	848.82
1019	869.88	824.88	795	893.85	848.85
1020	869.91	824.91	796	893.88	848.88
1021	869.94	824.94	797	893.91	848.91
1022	869.97	824.97	798	893.94	848.94
1023	870.00	825.00	799	893.97	848.97