MOTOROLA

When printed by Motorola

MTM800
With Enhanced Control Head
TETRA Mobile Terminals
Product Information Manual

Publication Number
6866535D14-C

Copyright Information

September 2008

6866535D14-C

DOCUMENT HISTORY

The following major changes have been implemented in this manual:

Edition	Description	Chapter, Paragraph	Date
6866535D14-A	Initial edition		Oct 2007
6866535D14-B	MR5.7 feature update	Chapter 1-3	Jul 2008
6866535D14-C	Correction of DGNA Auto-Attach description	Chapter 3	Sep 2008

TABLE OF CONTENTS

Chapter 1: Product Overview

Chapter 2: Services and Feature Description

Chapter 3: Customer Programming Software (CPS)

Chapter 4: Data Connection

Chapter 1

PRODUCT OVERVIEW

1 Introduction

This Product Information Manual explains all the features, and functionality of the MTM800 Enhanced TETRA Terminal and the Customer Programming Software (CPS) used for programming the terminal.

It describes the following:

- Available features
- The user interface
- Accessories
- Product ordering
- The Customer Programming Software (CPS)
- Connection to a PC for data operation

This manual complements the available TETRA product sales and technical training and should be used in conjunction with the terminals on a live system. The hands on experience provides valuable practical knowledge that can be used to help explain the benefits and use of the TETRA-Terminals to potential end users.

1.1 Using this manual

The Customer Information Manual is divided into four chapters that cover the following topics:

Chapter 1 This chapter is a review of the Motorola TETRA-Terminal showing the user interface and detailing the specifications of the terminal. It also provides a list of the available accessories, model numbers and how to order the products.

Chapter 2 This chapter describes the features of the product.

Chapter 3 It is a step by step guide of the ‘Customer Programming Software’ (CPS) and explains the available options, the settings’ range and defaults where applicable.

Chapter 4 This chapter describes the method for connecting a computer to the terminal for data transfer.

2 The TETRA-Terminal

The MTM800 Enhanced has been developed for the Public Safety, industry and transport users. It is a versatile product that can be installed in remote mount, desk, dash mount or on a motorcycle.

The introduction of the MTM800 Enhanced has been developed with the latest platform, common with the TETRA portable terminals MTH800 and MTP850.

The main new features are:

- latest powerful chipset
- enabling features such as Multi Slot Packed Data (MSPD) or GPS
- greater memory capacity, ready for future software upgrades and increase use of data
- Integrated GPS receiver as an optional module
- End-to-End Encryption (E2E) as an optional module

2.1 Terminal Software Upgrades

As customer communication requirements evolve, they plan to make their existing platform evolve through software upgrades.

To facilitate these upgrades, the Customer Programming Software (CPS) is common to all Motorola TETRA terminals.

New features are developed on all platforms to facilitate user experience.

2.2 Quality Assurance

2.2.1 Accelerated Life Testing

Motorola Accelerated Life Test (ALT), this testing simulates 5 years hard use in the field and all Motorola terminal products must pass this rigorous testing prior to shipping.

2.2.2 Environmental Protection

The Terminal has been designed and tested by Motorola to meet the required European and American Standards specifications.

2.2.3 IP54 & ETS300 019 - 1-7 Class 7.3 (Standard Control Head)

These standards demonstrate the terminal's ability to withstand rain and dust.

2.2.4 Military Standards MIL 810 C - F

These Military standards ensure efficient terminal operation in rough environments.

2.2.5 European Specifications

The terminals also meet the following European Specifications.

Specification	Type
EN3003 05	RF Specifications
EN301_489 - 18	EMC
EN60950	Product Electrical Safety
EN50360	Humane Exposure Safety
EN303 035 - 1:2000	Radio Parameters
EN303 035 - 2:2001	Radio Parameters

3 MTM800 Enhanced - Standard & Motorcycle Control Head

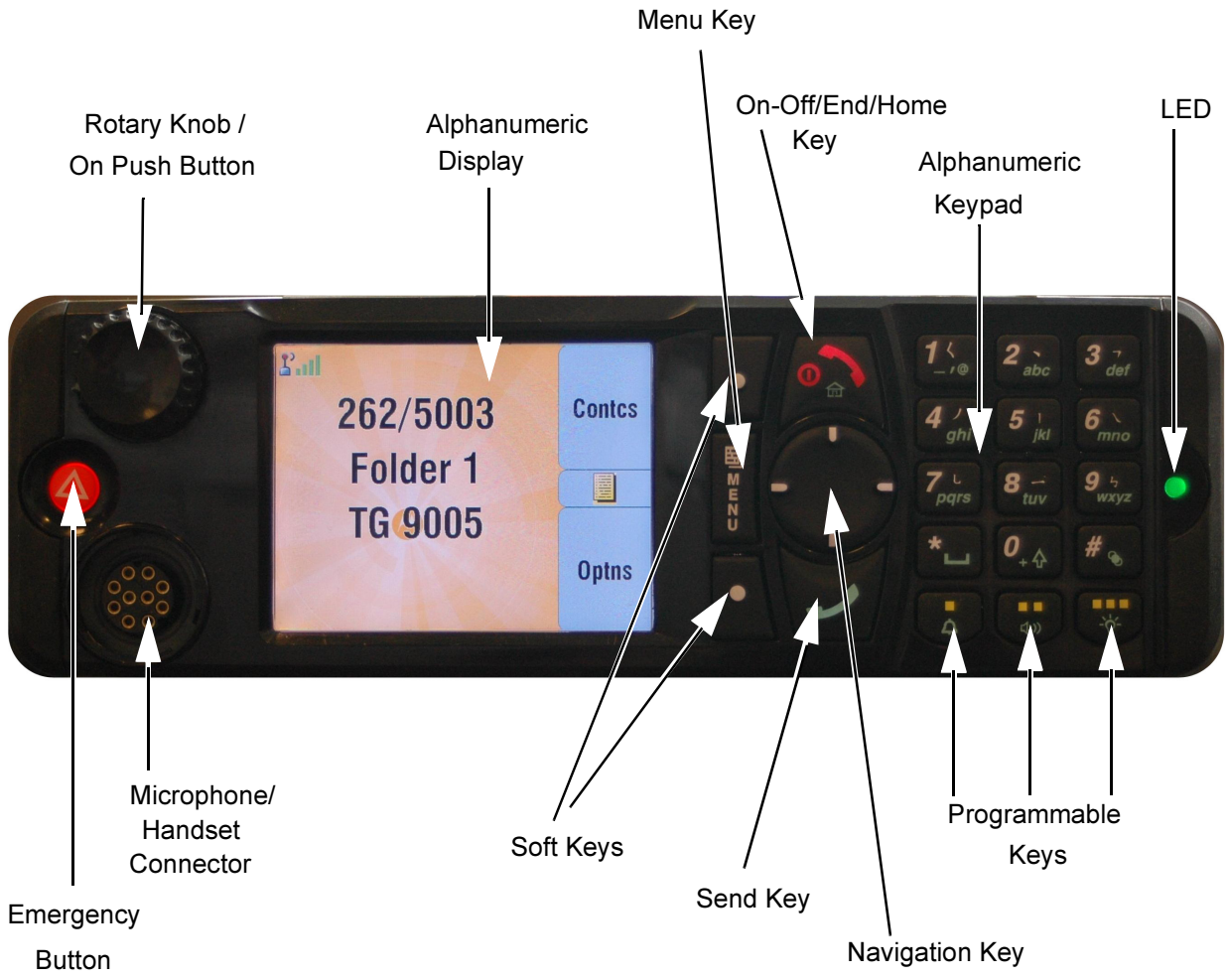


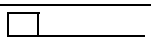
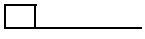
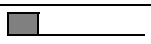
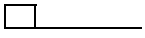
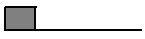
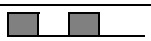
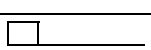
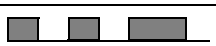
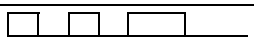
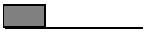
Figure 1-1 MTM800 Enhanced - Standard and Motorcycle Control Head

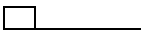
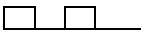
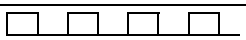
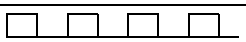
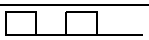
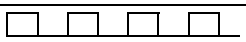
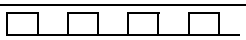
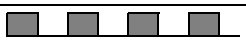
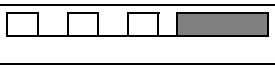
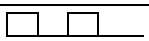
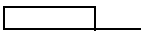
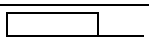
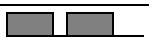
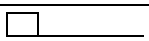
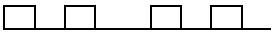
3.1 LED Indications

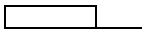
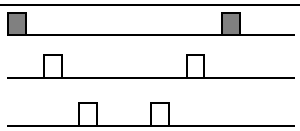
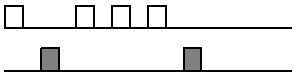
These are a visual indication of the operational state of the terminal.

Indication	Terminal Status
Green - Solid	In Use
Green - Blinking	In Service
Red - Solid	Out of Service
Red - Blinking	Connecting to Network / Entering DMO
Amber - Solid	Transmit Inhibit Active (TXI) / Channel Busy in DMO
Amber - Blinking	Incoming Call
No Indication	Terminal Powered Down

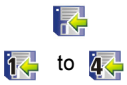
3.2 Audio Signal Tones

□ = High Tone; ■ = Low Tone;		
Description	**Type**	**Repeated**
Idle		
• Back to Home display • Back to rotary volume use when rotary scroll timer expires • Back to coverage • Back to full service		Once
Clear-to-send		Once
Bad key press		Once
• Good key press • MTM800 Enhanced self-test fails at power up • From out-of-service to in-service		Once
In Call		
Call clear warning		Once
Call waiting tone while Phone or Private Call are pending.		Every 6 seconds, until a call is terminated.
Data connected or Data disconnected		Once
Talk permit sounds upon pressing the PTT.	 	Once (Normal Tone) Once (Short Tone)
Talk permit without gateway sounds upon pressing PTT. The tone indicates the gateway is no longer available.	 	Twice Once

☐ = High Tone; ■ = Low Tone;		
Description	**Type**	**Repeated**
• Talk prohibit • System busy • Time-out timer expire • Called MTM800 Enhanced not available or busy		Until you release the PTT.
• Call disconnected or failed due to network • Wrong number dialed		Once
DMO (Direct Mode) Entering		Once
DMO Exiting		Once
Local site trunking —entering/exiting		Once
Phone ring back (sending)		Every three seconds, until the called user answers or call is rejected.
Phone busy		Every 0.5 seconds
Status message sent to the dispatcher or failed.		Twice
Incoming Calls		
Status message acknowledged by the dispatcher.		Four times
Your MTM800 Enhanced received a Group Call without gateway (setup only).		Once
High-priority Group Call received		Once
Emergency Alarm sent or received		Twice
Emergency Alarm failed		Four times
Emergency Call received		Once
Phone ring, full-duplex Private Call (reception)	According to the Ring Style sub-menu setting.	Until you answer or the call is rejected.
Private Call received		Until the call is answered.
Private Call ringing to the caller		Until the call is answered.
Half-duplex Private Pre-emptive Priority Call (PPC) ring		Every 4 seconds, until the call is answered or rejected.
Full-duplex Private PPC ring		Every 4 seconds, until the call is answered or rejected.
Limited service		Once, upon entering limited service.
New mail received		Once
New Group Call		Once
Battery/General		
Volume setting (earpiece, keypad, speaker)		Continuous
Volume setting (ringer)		While setting the volume.
Transmit Inhibit (TXI)		Once
Rotary knob tone		Once, when toggling from list control to volume control.
Low battery alert		Repeated

= High Tone; = Low Tone;		
Description	**Type**	**Repeated**
DTMF (Dual Tone Multi-Frequency)	DTMF 	Continuous, until you release the key.
Call-Out		
Call-Out Storm Plan		Repeated after 0.4 second delay
Call-Out Test		Repeated
Call-Out Fallback		Repeated

3.3 Display Icons

Display Icon	Description
Trunked Mode Operation	
	**Signal Strength (TMO)** Allows you to check signal strength. More bars indicate a stronger signal.
	**No Service**
	**Priority Scan** Indicates priority scanning is activated in the MTM800 Enhanced.
	**Data Connected** Displayed when the MTM800 Enhanced is successfully connected to an external device and ready for data transfer.
	**Data Transmit/Receive** Displayed when the MTM800 Enhanced is transferring data to/ receiving data from the external device (laptop or desktop PC). **No number** — standby data session. **Number 1, 2, 3, or 4** — indicates active data session with 25%, 50%, 75%, or 100% bandwidth.
Direct Mode Operation	
	**Signal Strength (DMO)** Indicates an incoming Direct Mode Group Call.
	**Direct Mode** Displayed when the MTM800 Enhanced is in Direct mode.
	**DMO Gateway** Indicates that gateway is selected. The icon has three states: **Solid** — while the MTM800 Enhanced is synchronised with the gateway. **Blinking** — while the MTM800 Enhanced is not synchronised or during attachment. **No icon** — during a terminal to terminal and repeater call.

Display Icon	Description
	**DMO Repeater** Displayed when the repeater option in DMO is selected. This icon has three states: **Solid** — while the terminal has detected the repeater (i.e., when the terminal receives a presence signal). **Blinking** — while the terminal has not detected the repeater or during attachment. **No icon** — during a terminal to terminal and gateway call.
General Icons	
	**All Tones Off** Indicates that all alert tones are off in the MTM800 Enhanced.
	**Speaker Off** Indicates that the audio will not sound through the speaker.
	**Low Audio** Indicates that the audio mode is changed to low.
	**High Audio** Indicates that the audio mode is changed to high.
	**Earpiece Connected** Indicates that the earpiece is connected.
	**Emergency** Appears while the MTM800 Enhanced is in Emergency mode.
	**List Scrolling** Displayed to indicate that the Rotary kno
	**New Message Has Arrived** Indicates a new message just arrived.
	**New Message(s) in Inbox** Indicates that you have unread messages in your Inbox.
	**GPS** Indicates that your MTM800 Enhanced is receiving valid GPS location data.
	**End-to-End encryption (E2E)** **Solid** — E2E encryption mode is On • for the selected talkgroup, • for the highlighted talkgroup in the talkgroup list, • for the highlighted private number, • for the manually entered private number, • when transmitting voice in Group Calls, • when transmitting voice in half-duplex Private Calls. **Blinking** — E2E encryption mode is On • when receiving voice in Group Calls, • when receiving voice in half-duplex Private Calls, • during encrypted full-duplex Private Calls. **No Icon** — Icon is cleared • when E2E encryption mode of the call, highlighted group or private number is Off.

3.4 Supported Languages

The following languages are supported by the terminal:

- English
- German
- French
- Spanish
- Dutch
- Greek
- Italian
- Swedish
- Arabic
- Lithuanian
- Hungarian
- Russian (cyrillic)
- Chinese (simplified)
- Chinese (traditional)
- Korean
- Croatian
- Danish
- Greek
- Hungarian
- Macedonian
- Norwegian
- User definable display languages

It is also possible for the terminal text messages to be changed to some another language, supported by ISO 8859-1 characters, during programming.

4 Technical Specifications

4.1 General Specifications

Title	Specifications
Dimensions H x W x D	49 x 170 x 155 mm Terminal Only 60 x 185 x 175 mm with Next Generation Control Head
Weight	1350 g Terminal Only 1470 g Terminal with Next Generation Control Head
Talk Groups - TMO	2048
Talk Groups - DMO	1024
Phone Book Entries	225
Text Message List - (Outbox and Inbox)	200 Entries (short messages), 40 (long messages)
Text Message List - outgoing	max. 100 Entries depending on mail's length
Status List	100
Country Code/Network Code List	100
Scan Lists	40 Lists of 20 Groups
Operating Temperature	-30 to +60 ^{0}C
Storage Temperature	-40 to +85 ^{0}C
Humidity	ETS 300 019-1-5 Class 5.1 and 5.2, up to 95% R.H.@50 ^{0}C EIA/TIA 603 (95%) MIL810 95% RH 50 deg.
Dust & Water - Standard Control Head	IP54 (dust - cat. 1) for Next Gen. Control Head
Dust & Water - Motorcycle Control Head (M/C)	IP67 (dust - cat. 1) for M/C Next Gen. Control Head
Shock, Drop & Vibration	ETS 300019-1-5 class 5M2 and class 5M3 MIL 810 C - F
Thermal Shock	-40 °C to +80 ^{0}C
SB9600 Support	No

4.2 RF Specifications

Title	Specifications
Frequency Bands	350 - 390 MHz, or 380 - 430 MHz, or 410 - 470 MHz, or 806 - 870 MHz

Title	Specifications
RF Channel Bandwidth	25 kHz
Transmit/Receive Separation	10 MHz (350 - 390 MHz), 10 MHz (380 - 430 MHz), 10 MHz (410 - 470 MHz), 45 MHz (806 - 870 MHz)
Switching Bandwidth (TMO)	40 MHz (350 - 390 MHz), 50 MHz (380 - 430 MHz), 60 MHz (410 - 470 MHz), 19 MHz (806 - 870 MHz)
Switching Bandwidth (DMO)	40 MHz (350 - 390 MHz), 50 MHz (380 - 430 MHz), 60 MHz (410 - 470 MHz), 19 MHz (806 - 870 MHz)
Transmitter RF Power Output	3 W, Class 3, (all bands)
RF Power Control	4 Steps of 5 dB
RF Power Level Accuracy	± 2 dB
Receiver Class	A & B
Receiver Static Sensitivity dBm	-112 minimum (-114 Typical)
Receiver Dynamic Sensitivity dBm	-103 minimum (-105 Typical)

4.3 GPS Specifications

Title	Specification
Simultaneous Satellites	12
Mode of Operation	Autonomous or Assisted (A-GPS)
GPS Antenna	Supports active antenna (5V, 25mA supply) via FME male connector
Sensitivity	-152 dbm / -182dbW
Accuracy (Measured at -137dbm)	5 meters - 50% probable. 10 meters - 95% probable

5 Ordering the MTM800 Enhanced & Accessories

General Information

TETRA Subscribers are only available to Accredited Channel Partners.

Ordering Requirements

The MTM800 Enhanced is Motorola's latest advanced digital mobile TETRA with optional integrated GPS module and UCM. This terminal is based on a new digital platform technology, which ensures high performance, excellent audio quality as well as wide band RF (Radio Frequency) operation. A wide range of accessories and the flexible MTM800 design ensures that most applications are covered by ordering the appropriate model, options and accessories. MTM800 Enhanced is currently available in 350 - 390 MHz, 380 - 430 MHz, 410 - 470 MHz or 806 - 870 MHz. All terminals are fully TETRA compliant.

The below Remote Mount models feature a control head with full keypad and display and ships with the options ordered. If the model is ordered with the expansion control head (found under “remote mount accessories”) an RS232 interface is available on the expansion control head.

If the model is ordered without the expansion control head (Remote Mount Kit Option), the Active Data Cable GMKN1022 allows Short and Packet Data connectivity at the 20-pin Accessory Connector on the rear of the terminal. You need to order GMKN1022 as a separate line accessory item.

Additionally the transceiver MTM800 Enhanced can be supplied in the following configurations:

MTM800 Enhanced with Next Gen. motorcycle control head or MTM800 Enhanced as Dash / Desk Mount.

Ordering Information

Each Model configuration has unique ordering rules and careful attention to these will ensure that the correct options and or accessories are ordered.

5.1 Remote Mount - version for flexible vehicle installation

1. Order the main model (includes remote standard control head).
2. One option from each of the following categories is mandatory
   - Either clear or encryption software option,
   - GPS option. Please note that terminals without the GPS option ordered up front cannot be retrofitted later to have the GPS feature.
   - UCM option
   - ❏ Order remote mounting kit option (only one selection per model)
   - ❏ Order remote mount speaker (only one selection per model)
   - ❏ Order language of user guide (only one selection per model)
3. Add additional hardware accessories as needed. Note: Antenna is now a default Option for

inclusion in basic package, use Delete Option if No Antenna required

4. Customers can select from the Antenna Options shown or contact your Systems Engineer to discuss requirements. The range of Antennas outside of these options is extensive. Note there are two Antenna Option modes, GPS /Tetra combined or GPS with separate Tetra Antenna.
5. Please note that the GMKN1022 is not required and should not be used with model ordered with an expansion control head. Use the built-in 9 pin D connector instead for short and packet data connectivity.
6. Note: Export controls apply when ordering encryption

5.2 Dash Mount - version for compact installation

1. Order the main model (includes standard control head).
2. One option from each of the following categories is mandatory
   - ❏ Order the options:
     - either clear or encryption software option,
     - GPS option. Please note that terminals without the GPS option ordered up front cannot be retrofitted later to have the GPS feature.
     - UCM option
   - ❏ Select dash mount accessory configuration (only one selection per model)
   - ❏ Order an 'add: trunnion' option from Mounting options (only one selection per model)
   - ❏ Order language of user guide (only one selection per model)
3. Add additional hardware accessories as needed. Note: Antenna is now a default Option for inclusion in basic package, use Delete Option if No Antenna required
4. Customers can select from the Antenna Options shown or contact your Systems Engineer to discuss requirements. The range of Antennas outside of these options is extensive. Note there are two Antenna Option modes, GPS /Tetra combined or GPS with separate Tetra Antenna.
5. Note: Export controls apply when ordering air-encryption & UCM.

5.3 Desk Mount - version for use in the office

1. Order the main model (includes standard control head).
2. One option from each of the following categories is mandatory
   - ❏ Select Control Head option.
   - ❏ Order either clear or encryption software option (only one selection per model)
   - ❏ Please note that terminals without the GPS option ordered up front cannot be retrofitted later to have the GPS feature.
   - ❏ Order desktop accessory configuration (only one selection per model)
   - ❏ Order 'del: trunnion' option from Mounting options (only one selection per model)
   - ❏ Order language of user guide (only one selection per model)
   - ❏ A Power Cable option must be ordered (only one selection per model)
   - ❏ A line cord option must be ordered from Power Cord(s).
3. Add additional hardware accessories as needed. Note: Antenna is now a default Option for

inclusion in basic package, use Delete Option if No Antenna required

4. Customers can select from the Antenna Options shown or contact your Systems Engineer to discuss requirements. The range of Antennas outside of these options is extensive. Note there are two Antenna Option modes, GPS /Tetra combined or GPS with separate Tetra Antenna.
5. Note: Export controls apply when ordering air-encryption & UCM.

5.4 Motorcycle - version for motorcycle installation

1. Order the main model (includes the motorcycle control head).
2. One option from each of the following categories is mandatory
   - ❏ Order the options:
     - either clear or encryption software option,
     - GPS option. Please note that terminals without the GPS option ordered up front cannot be retrofitted later to have the GPS feature.
     - UCM option
   - ❏ Order microphone and speaker configuration (only one selection per model)
   - ❏ Order mounting options (only one selection per model)
   - ❏ Order language of Motorcycle user guide (only one selection per model)
3. Add additional hardware accessories as needed. Note: Antenna is now a default Option for inclusion in basic package, use Delete Option if No Antenna required
4. Customers can select from the Antenna Options shown or contact your Systems Engineer to discuss requirements. The range of Antennas outside of these options is extensive. Note there are two Antenna Option modes, GPS /Tetra combined or GPS with separate Tetra Antenna.
5. Note: Export controls apply when ordering air-encryption & UCM.

5.5 Data / Expansion Head

1. Order the main model
2. One option from each of the following categories is mandatory
   - ❏ Order the options:
     - either clear or encryption software option,
     - GPS option. Please note that terminals without the GPS option ordered up front cannot be retrofitted later to have the GPS feature.
     - UCM option
   - ❏ Order language of user guide (only one selection per model)
3. Add additional hardware accessories as needed. Note: Antenna is now a default Option for inclusion in basic package, use Delete Option if No Antenna required
4. Antenna are not included in the basic package, Customers can select from the Antenna Options shown or contact your Systems Engineer to discuss requirements. The range of Antennas outside of these options is extensive.
5. **Note**: Export controls apply when ordering encryption

Models

MTM800 Enhanced	Model Number
MTM800 ENH 380 - 430MHz DASH MT912M	M80PCS6TZ5_N
MTM800 ENH 380 - 430MHz DESK MT912M	M80PCS6TZ4_N
MTM800 ENH 380 - 430MHz REMOTE MT912M	M80PCS6TZ6_N
MTM800 ENH 380 - 430MHz MOTORCYCLE MT912M	M80PCS6TZ2_N
MTM800 ENH 410 - 470MHz DASH MT512M	M80RCS6TZ5_N
MTM800 ENH 410 - 470MHz DESK MT512M	M80RCS6TZ4_N
MTM800 ENH 410 - 470MHz REMOTE MT512M	M80RCS6TZ6_N
MTM800 ENH 410 - 470MHz MOTORCYCLE MT512M	M80RCS6TZ2_N
MTM800 ENH 806 - 870 Dash MT712M	M80UCS6TZ5_N
MTM800 ENH 806 - 870 Desk MT712M	M80UCS6TZ4_N
MTM800 ENH 806 - 870 Remote MT712M	M80UCS6TZ6_N
MTM800 ENH 806 - 870 MOTORCYCLE MT712M	M80UCS6TZ2_N
MTM800 ENH 350 - 390MHz DASH MT812M	M80NCS6TZ5_N
MTM800 ENH 350 - 390MHz DESK MT812M	M80NCS6TZ4_N
MTM800 ENH 350 - 390MHz REMOTE MT812M	M80NCS6TZ6_N
MTM800 ENH 350 - 390MHz MOTORCYCLE MT812M	M80NCS6TZ2_N

Options

MTM800 Enhanced - Standard & Motorcycle Control Heads

Description	Nomenclature
ADD: STD ENH CTRL HD ROMAN (keypad: Roman)	GA00095AA
ADD: STD ENH CTRL HD CHINESE (Keypad: Chinese)	GA00096AA
ADD: STD ENH CTRL HD KOREAN (Keypad: Korean)	GA00097AA
ADD: STD ENH CTRL HD ARABIC (Keypad: Arabic)	GA00098AA
ADD: STD ENH CTRL HD BOPOMOFO (Keypad: BoPoMoFo)	GA00099AA
ADD: STD ENH CTRL HD CYRILLIC (Keypad: Russian Cyrillic)	GA00100AA

Description	Nomenclature
ADD: REM ENH CTRL HD ROMAN	GA00101AA
ADD: REM ENH CTRL HD CHINESE	GA00102AA
ADD: REM ENH CTRL HD KOREAN	GA00103AA
ADD: REM ENH CTRL HD ARABIC	GA00104AA
ADD: REM ENH CTRL HD BOPOMOFO	GA00105AA
ADD: REM ENH CTRL HD CYRILLIC	GA00106AA
ADD: M/C ENH CTRL HD ROMAN	GA00107AA
ADD: M/C ENH CTRL HD CHINESE	GA00108AA
ADD: M/C ENH CTRL HD KOREAN	GA00109AA
ADD: M/C ENH CTRL HD ARABIC	GA00110AA
ADD: M/C ENH CTRL HD BOPOMOFO	GA00111AA
ADD: M/C ENH CTRL HD CYRILLIC	GA00112AA
DEL: DELETE ENH CTRL HD	GA00113AA
ADD: STD ENH CTR HD HUNGARIAN	GA00180AA
ADD: M/C ENH CTR HD HUNGARIAN	GA00182AA

MTM800 Enhanced - Software 350 - 390 MHz

Description	Nomenclature
ADD: ENH TX/RX 350-390 CLEAR	GA00080AA
ADD: ENH TX/RX 350-390 TEA1	GA00081AA
ADD: ENH TX/RX 350-390 TEA3	GA00082AA
ADD: ENH TX/RX 350-390 GPS CLEAR	GA00083AA
ADD: ENH TX/RX 350-390 GPS TEA1	GA00084AA
ADD: ENH TX/RX 350-390 GPS TEA3	GA00085AA
ADD: ENH TX/RX 350 UCM AES128	GA00086AA
ADD: ENH TX/RX 350 UCM TEA1 AES128	GA00087AA
ADD: ENH TX/RX 350 UCM TEA3 AES128	GA00088AA
ADD: ENH TX/RX 350 UCM/GPS AES128	GA00089AA
ADD: ENH TX/RX 350 UCM/GPS TEA1 AES128	GA00090AA
ADD: ENH TX/RX 350 UCM/GPS TEA3 AES128	GA00091AA

MTM800 Enhanced - Software 380 - 430 MHz

Description	Nomenclature
ADD: ENH TX/RX 380-430 CLEAR	GA00040AA
ADD: ENH TX/RX 380-430 TEA1	GA00041AA
ADD: ENH TX/RX 380-430 TEA2	GA00042AA
ADD: ENH TX/RX 380-430 TEA3	GA00043AA
ADD: ENH TX/RX 380-430 GPS CLEAR	GA00044AA
ADD: ENH TX/RX 380-430 GPS TEA1	GA00045AA
ADD: ENH TX/RX 380-430 GPS TEA2	GA00046AA
ADD: ENH TX/RX 380-430 GPS TEA3	GA00047AA
ADD: ENH TX/RX 380-430 UCM AES 128	GA00048AA
ADD: ENH TX/RX 380-430 UCM TEA1 AES128	GA00049AA
ADD: ENH TX/RX 380-430 UCM TEA2 AES128	GA00050AA
ADD: ENH TX/RX 380-430 UCM TEA3 AES128	GA00051AA
ADD: ENH TX/RX 380-430 UCM/GPS AES128	GA00052AA
ADD: ENH TX/RX 380-430 UCM/GPS TEA1 AES128	GA00053AA
ADD: ENH TX/RX 380-430 UCM/GPS TEA2 AES128	GA00054AA
ADD: ENH TX/RX 380-430 UCM/GPS TEA3 AES128	GA00055AA
ADD: ENH TX/RX 380-430 UCM-M AES 128	GA00148AA
ADD: ENH TX/RX 380-430 UCM-M TEA1 AES 128	GA00149AA
ADD: ENH TX/RX 380-430 UCM-M TEA2 AES 128	GA00150AA
ADD: ENH TX/RX 380-430 UCM-M TEA3 AES 128	GA00151AA
ADD: ENH TX/RX 380-430 GPS UCM-M AES 128	GA00152AA
ADD: ENH TX/RX 380-430 GPS UCM-M TEA1 AES 128	GA00153AA
ADD: ENH TX/RX 380-430 GPS UCM-M TEA2 AES 128	GA00154AA
ADD: ENH TX/RX 380-430 GPS UCM-M TEA3 AES 128	GA00155AA

MTM800 Enhanced - Software 410 - 470 MHz

Description	Nomenclature
ADD: ENH TX/RX 410-470 CLEAR	GA00056AA
ADD: ENH TX/RX 410-470 TEA1	GA00057AA
ADD: ENH TX/RX 410-470 TEA2	GA00058AA

Description	Nomenclature
ADD: ENH TX/RX 410-470 GPS CLEAR	GA00059AA
ADD: ENH TX/RX 410-470 GPS TEA1	GA00060AA
ADD: ENH TX/RX 410-470 GPS TEA2	GA00061AA
ADD: ENH TX/RX 410-470 UCM AES 128	GA00062AA
ADD: ENH TX/RX 410-470 UCM TEA1 AES128	GA00063AA
ADD: ENH TX/RX 410-470 UCM TEA2 AES128	GA00064AA
ADD: ENH TX/RX 410-470 UCM/GPS AES128	GA00065AA
ADD: ENH TX/RX 410-470 UCM/GPS TEA1 AES128	GA00066AA
ADD: ENH TX/RX 410-470 UCM/GPS TEA2 AES128	GA00067AA

MTM800 Enhanced - Software 806 - 870 MHz

Description	Nomenclature
ADD: ENH TX/RX 806-870 CLEAR	GA00068AA
ADD: ENH TX/RX 806-870 TEA1	GA00069AA
ADD: ENH TX/RX 806-870 TEA3	GA00070AA
ADD: ENH TX/RX 806-870 GPS CLEAR	GA00071AA
ADD: ENH TX/RX 806-870 GPS TEA1	GA00072AA
ADD: ENH TX/RX 806-870 GPS TEA3	GA00073AA
ADD: ENH TX/RX 806-870 UCM AES 128	GA00074AA
ADD: ENH TX/RX 806-870 UCM TEA1 AES128	GA00075AA
ADD: ENH TX/RX 806-870 UCM TEA1 AES128	GA00076AA
ADD: ENH TX/RX 806-870 UCM/GPS AES128	GA00077AA
ADD: ENH TX/RX 806-870 UCM/GPS TEA1 AES128	GA00078AA
ADD: ENH TX/RX 806-870 UCM/GPS TEA3 AES128	GA00079AA

MTM800 Enhanced - Dash Mount

Description	Nomenclature
ADD: COMP FIST MIC GCAI	GA00134AA
ADD: HEAVy DUTY MIC GCAI	GA00135AA
ADD: VISOR MIC	GA00139AA
DEL Mic	GA00140AA

MTM800 Enhanced - Remote Mount

Description	Nomenclature
ADD: REM HEAD FOR ENH CTRL HD (to be connected to the MTM800)	GA00122AA
ADD: REM ENH CTR HD HUNGARIAN	GA00181AA
ADD: EXP HEAD FOR ENH CTRL HD (to be connected to the MTM800)	GA00123AA
ADD: Remote mount cable (radio to C/H) - 3m	GA00124AA
ADD: Remote mount cable (radio to C/H) - 5m	GA00125AA
ADD: Remote mount cable (radio to C/H) - 7m	GA00126AA
ADD: REMote mount cable (radio to C/H) - 10 m	GA00127AA
Add: acc expansion cable gcai (radio to M/C control head9	ga00116aa
ADD: ENH CTRL HD TRUNNION	GA00128AA
ADD: M/C ENH CTRL HD TRUNNION	GA00129AA
ADD: DIN MOUNT frame	GA00130AA
ADD : ENH CTRL HD DIN TRUNNION	GA00131AA
ADD: POWER SUPPLY	GA00132AA
DEL: POWER SUPPLY	GA00133AA
DEL: TAMPER EVIDENT LABEL	G00147AA
ADD: COMP FIST MIC GCAI (REMOTE/MC)	GA00222AA

MTM800 Enhanced - Desktop Configuration

Description	Nomenclature
ADD: DESK MIC GCAI	GA00138AA
ADD: DESKTOP TRAY W SPK	GA00114AA
ADD: DESKTOP TRAY W/O SPK	GA00115AA
ADD: ACC EXPANSION CABLE GCAI	GA00116AA

MTM800 Enhanced - Mounting

Description	Nomenclature
ADD: KEY LOCK MOUNT (Adds key lock mount RLN4779)	B81BH
ADD: TRUNION LOW PROFILE (Adds low profile trunnion GLN7324)	G844AA
ADD: TRUNION HIGH PROFILE (Adds high profile trunnion GLN7317)	G845AA

Description	Nomenclature
ADD: DIN MOUNT KIT	G929AA
DEL: TRUNNION	H857AA

Power Cords

Description	Nomenclature
ADD: LINE CORD UK (Adds UK line cord NTN7375)	G721AA
ADD: LINE CORD EURO (Adds EURO line cord NTN7374)	G722AA
ADD: LINE CORD US (Adds US line cord NTN7373)	G723AA
ADD: BATTERY POWER CABLE 3M	G320AH
ADD: BATTERY POWER CABLE 6M	G102AD

Antennas

Following Antenna range is suitable but NOT confined to the following configurations:

- Remote Mount
- Dash Mount
- Data / Expansion

Combined TETRA & GPS Antennas

Description	Frequency Range	Nomenclature
ADD: Ant Combined Tetra/GPS 350MHz	350 - 390 MHz	G981AA
ADD: ANTENNA Combined Tetra and GPS Tetra, Whip, GPS 26dB LNA. Panorama GPSK-Tet Accessory Kit GMAE4248A	380 - 430 MHz	G893AA
ADD: ANTENNA Combined Tetra and GPS Tetra, Whip, GPS 26dB LNA. Panorama GPSK Tet S1 Accessory Kit GMAE4249A	380 - 400 MHz	G894AA
ADD: ANTENNA Combined Tetra and GPS Tetra, Whip, GPS 26dB LNA. Panorama GPSK Tet S2 Accessory Kit GMAE4250A	410 - 430 MHz	G895AA
ADD: ANTENNA COMBINED UHF/GPS	430 - 470 MHz	G911AA
DEL: ANTENNA GPS		G957AA

GPS Antennas

Description	Frequency Range	Nomenclature
ADD: ANTENNA GPS Only, Panel Mount Panorama GPSF- P Accessory Kit GMAG4251A	GPS	G896AA
ADD: ANTENNA GPS Only, Magnetic Mount Panorama GPSM Accessory Kit GMAG4252A	GPS	G897AA
DEL: ANTENNA GPS	GPS	G957AA

TETRA Antennas

Description	Frequency Range	Nomenclature
ADD: Antenna Tetra Glass Mount 350MHz	350 - 390 MHz	G984AA
ADD: ANTENNA Tetra Glass Mount Panorama GM390 Accessory Kit GMAE4253A	380 - 400 MHz	G898AA
ADD: ANTENNA Tetra Glass Mount Panorama GM420 Accessory Kit GMAE4254A	410 - 430 MHz	G899AA
ADD: AntENNA UHF Glass Mount	450 - 470 MHz	G912AA
ADD: Antenna Tetra Panel/Roof Mount	350 - 390 MHz	G985AA

Description	Frequency Range	Nomenclature
ADD: ANTENNA Tetra Panel Mount Panorama EBF-Tet Accessory Kit GMAE4255A	380 - 430 MHz	G900AA
ADD: AntENNA UHF Panel Mount	430 - 470 MHz	G913AA
ADD: Antenna Tetra Magnetic Mount	350 - 390 MHz	G986AA
ADD: ANTENNA Tetra Magnetic Mount Panorama MD390-5 Accessory Kit GMAE4256A	380 - 400 MHz	G901AA
ADD: ANTENNA Tetra Magnetic Mount Panorama MD420-5 Accessory Kit GMAE4257A	410 - 430 MHz	G902AA
ADD: AntENNA UHF Magnetic Mount	430 - 470 MHz	G914AA
ADD: Antenna Tetra Covert	350 - 390 MHz	G987AA
ADD: ANTENNA Tetra Covert, Strip Antenna, Glass, Panorama EFS13F Accessory Kit GMAE4258A	380 - 400 MHz	G903AA
ADD: ANTENNA Tetra Covert, Strip Antenna, Glass, Panorama EFS23F Accessory Kit GMAE4259A	410 - 430 MHz	G904AA
ADD: AntENNA UHF Covert Strip	420 - 465 MHz	G915AA
ADD: Antenna Tetra Low Profile	350 - 390 MHz	G988AA
ADD: ANTENNA Tetra Low Profile, Panorama LP390 Accessory Kit GMAE4260A	380 - 400 MHz	G905AA
ADD: ANTENNA Tetra Low Profile, Panorama LP420 Accessory Kit GMAE4261A	410 - 430 MHz	G906AA
ADD: AntENNA UHF Low Profile	450 - 470 MHz	G916AA
DEL: ANTENNA TETRA		G115AC
DEL: ANTENNA GPS		G957AA

Desk Mount Antennas

Following antennas are suitable for Desk Mount configurations. Antennas are general purpose coverage including internal buildings such as shopping complexes, Airport complexes etc. GPS is included for completeness. A suitable mounting bracket is Motorola Part No. MNT62312B1.

Description	Frequency Range	Nomenclature
ADD: Antenna Tetra Wall Mount	350 – 390MHz	G989AA
ADD: ANTENNA Tetra Wall Mount Panorama ODP390 Accessory Kit GMAE4262A	380 – 400 MHz	G907AA
ADD: ANTENNA Tetra Wall Mount	430 - 470 MHz	G917AA
ADD: ANTENNA Tetra Wall Mount Panorama ODP420 Accessory Kit GMAE4263A	410 – 430 MHz	G908AA
DEL: ANTENNA TETRA		G115AC

Motorcycle TETRA Antennas

Description	Frequency Range	Nomenclature
ADD: Antenna Tetra Motorcycle	350 - 390 MHz	G990AA
ADD: ANTENNA Motorcycle TETRA Panorama HM S1 Accessory Part No. GMAE4266A	380 - 400 MHz	G909AA
ADD: ANTENNA Motorcycle Tetra Panorama HM S2 Accessory Part No. GMAE4267A	410 - 430 MHz	G910AA
ADD: AntENNA UHF Motorcycle	438 - 470 MHz	G918AA
DEL: ANTENNA TETRA		G115AC

Motorcycle GPS Antennas

Description	Frequency Range	Nomenclature
ADD: ANTENNA GPS Only, Panel Mount Panorama GPSP- F, Accessory Part No GMAG4251A	GPS	G896AA
DEL: ANTENNA GPS		G957AA

MTM800 Enhanced - User Guides

Description	Nomenclature
ADD: USER GUIDE Std MTM800 Enhanced EMEA (English, German, French, Spanish, Netherlands, ARABIC)	GA00141AA
ADD: USER GUIDE Std MTM800 Enhanced EMEA (English, Russian, Italian, Polish)	GA00142AA
ADD: USER GUIDE Std MTM800 Enhanced EMEA (English, DANISH, Swedish, Norwegian, PORtUGUESE Braz)	GA00143AA
ADD: USER GUIDE Std MTM800 Enhanced APAC (English, Simplified chinese	GA00145AA
ADD: USER GUIDE Std MTM800 Enhanced APAC (English, traditional chinese	GA00144AA
ADD: USER GUIDE Std MTM800 Enhanced APAC (English, korean	GA00146AA
DEL: MTM800 BUG	GA00006AA

Miscellaneous

Description	Nomenclature
ADD: TAMPER EVIDENT LABEL MTM800	G802AA

Accessories

Alarm

Description	Nomenclature
EXTERNAL ALARM BUZZER	GLN7282

Antennas

350 - 390 MHz Antennas

Frequency Range	Description	Nomenclature
350 - 390 MHz	Antenna Combined Tetra and GPS	GMAE4493A
350 - 390 MHz	Antenna Whip Flexible Hinged	GMAD4501A
350 - 390 MHz	Antenna Whip Hinged	GMAD4502A
350 - 390 MHz	Antenna Glass Mount	GMAD4494A
350 - 390 MHz	Antenna Panel Mount	GMAD4495A
350 - 390 MHz	Antenna Magnetic Mount	GMAD4496A
350 - 390 MHz	Antenna Covert	GMAD4497A
350 - 390 MHz	Antenna Low Profile	GMAD4503A
350 - 390 MHz	Antenna Wall Mount	GMAD4498A
350 - 390 MHz	Antenna Motorcycle	GMAD4499A

380 - 430 MHz Antennas

Frequency Range	Description	Nomenclature
380 - 430 MHz	Antenna Combined TETRA and GPS	GMAE4248_
380 - 400 MHz	Antenna Combined TETRA and GPS	GMAE4249_
410 - 430 MHz	Antenna Combined TETRA and GPS	GMAE4250_
thickness 4mm	Antenna Mount Panel- Choose Whip from below	GMLN4276_
thickness 6mm	Antenna Mount Panel - Choose Whip from below	GMLN4277_
Magnetic	Antenna Mount Panel- Choose Whip from below	GMLN4278_
380 - 400MHz	Antenna Whip - Flexible Hinged	GMAE4279_
410 - 430MHz	Antenna Whip - Flexible Hinged	GMAE4280_
380 - 430MHz	Antenna Whip - Flexible Hinged	GMAE4281_
380 - 400MHz	Antenna Whip - Hinged	GMAE4282_
410 - 430MHz	Antenna Whip - Hinged	GMAE4283_

Frequency Range	Description	Nomenclature
380 - 430MHz	Antenna Whip - Hinged	GMAE4284_
GPS	Antenna GPS Panel Roof Mount 26db lna	GMAG4251_
GPS	Antenna GPS panel Magnetic Mount 26db lna	GMAG4252_
380 - 400MHz	Antenna Glass Mount	GMAE4253_
410 - 430MHz	Antenna Glass Mount	GMAE4254_
380 - 430MHz	Antenna Panel Mount	GMAE4255_
380 - 400MHz	Antenna Magnetic Mount	GMAE4256_
410 - 430MHz	Antenna Magnetic Mount	GMAE4257_
380 - 400MHz	Antenna Covert	GMAE4258_
410 - 430MHz	Antenna Covert	GMAE4259_
380 - 400MHz	Antenna Low Profile	GMAE4260_
380 - 400MHz	Antenna Low Profile	GMAE4261_
380 - 400MHz	Antenna Wall Mount	GMAE4262_
410 - 430MHz	Antenna Wall Mount	GMAE4263_
380 - 400MHz	Antenna Motorcycle	GMAE4266_
410 - 430MHz	Antenna Motorcycle	GMAE4267_

450 - 470 MHz Antennas

Frequency range	Description	Nomenclature
430 - 470 MHz	Antenna Combined TETRA and GPS	GMAE4269_
	Antenna Mount Panel Choose Whip from below	GMAE4276_
	Antenna Mount Panel Choose Whip from below	GMAE4277_
	Antenna Mount Magnetic Choose Whip from below	GMLN4278_
430 - 470 MHz	Antenna Whip - Flexible Hinged	GMAE4285_
430 - 470 MHz	Antenna Whip - Hinged	GMAE4286_
GPS	Antenna GPS Panel Mount	GMAE4251_
GPS	Antenna GPS Magnetic Mount	GMAE4252_
450 - 470 MHz	Antenna Glass Mount	GMAE4270_
430 - 470 MHz	Antenna Panel Mount	GMAE4271_
430 - 470 MHz	Antenna Magnetic Mount	GMAE4272_
430 - 470 MHz	Antenna Covert	GMAE4273_
450 - 470 MHz	Antenna Low Profile	GMAG4274_
430 - 470 MHz	Antenna Wall Mount	GMAG4275_
430 - 470 MHz	Antenna Motorcycle	GMAE4268_

806 - 870 MHz Antennas

Frequency range	Description	Antennas
800 MHz	Antenna Combined TETRA and GPS	GMAF4408_
GPS	Antenna GPS Panel Mount	GMAG4251_
GPS	Antenna GPS Magnetic Mount	GMAG4252_
800 MHz	Antenna Glass Mount	GMAF4409_
800 MHz	Antenna Glass Mount 3dB	GMAF4410_
800 MHz	Antenna Eurobase	GMAF4411_
800 MHz	Antenna MAG Mount	GMAF4412_
800 MHz	Antenna Magnetic Mount 3dB	GMAF4413_
800 MHz	Antenna Covert	GMAF4414_
800 MHz	Antenna Low Profile	GMAF4415_
800 MHz	Antenna Wall Mount	GMAF4416_
800 MHz	Antenna Motorcycle	GMAF4417_

Additional information on antennas can be found in related General Information Bulletins. These can be down loaded from Motorola On-line

https://emeaonline.motorola.com

MTM800 Enhanced - Dash Mount Standard Control Heads

Description	Nomenclature
NG CONTROL HEAD ENGLISH	GMWN4298A
NG CONTROL HEAD CHINESE	GMWN4299A
NG CONTROL HEAD KOREAN	GMWN4300A
NG CONTROL HEAD ARABIC	GMWN4301A
NG CONTROL HEAD BOPOMOFU	GMWN4302A
NG CONTROL HEAD CYRILLIC	GMWN4303A
NG CONTROL HEAD HUNGARIAN	GMWN4608A

MTM800 Enhanced - Remote Mount Standard Control Heads

Description	Nomenclature
NG REMOTE MT HD ENGLISH	GMWN4304A
NG REMOTE MT HD CHINESE	GMWN4305A
NG REMOTE MT HD KOREAN	GMWN4306A
NG REMOTE MT HD ARABIC	GMWN4307A
NG REMOTE MT HD BOPOMOFU	GMWN4308A
NG REMOTE MT HD CYRILLIC	GMWN4309A
NG REMOTE MT HD HUNGARIAN	GMWN4606A
ENH CTRL HD Remote Trunnion incl. spacer & wing bolts	PMLN4912A
ENH CTRL HD DIN Frame TRUNNION incl. spacer & screws	PMLN5093A
din mounting kit	pmln5094
DAta expansion control head - connected to Mtm800	PMLN4908a

MTM800 Enhanced - Motorcycle Mount Control Heads

Description	Nomenclature
NG M/C HD ENGLISH	GMWN4600A
NG M/C HD HD CHINESE	GMWN4601A
NG M/C HD KOREAN	GMWN4602A
NG M/C HD ARABIC	GMWN4603A
NG M/C HD BOPOMOFU	GMWN4604A
NG M/C HD CYRILLIC	GMWN4605A
NG M/C HD HUNGARIAN	GMWN4607A
M/C ENH CTRL HD TRUNNION, SS	PMLN5092A
Remote Head - connected to Mtm800	PMLN4904B
DAta expansion control head - connected to Mtm800	PMLN4908a

MTM800 Enhanced - Remote Mount Cables for Standard Control Heads

Description	Nomenclature
Remote mount cable (radio to C/H) - 3m	RKN4077A
Remote mount cable (radio to C/H) - 5m	RKN4078A
Remote mount cable (radio to C/H) - 7m	RKN4079A
Remote mount cable (radio to C/H) - 10m	PMKN4020A
GCAI ACC EXPANSION CABLE 4m	PMKN4056A

MTM800 Enhanced - Remote Mount Cable for Motorcycle Control Heads

Description	Nomenclature
GCAI ACC EXPANSION CABLE 2.3M	PMKN4029A
NGCH MC TELCO CABLE 2.3m	PMKN4030A

MTM800 Enhanced - Installation & Alarm

Description	Nomenclature
EXTERNAL ALARM RELAY & CABLE	GKN6272A
EMERGENCY FOOT SWITCH	RLN4836AR

MTM800 Enhanced - Junction Box

Description	Nomenclature
EXTERNAL ALARM RELAY & CABLE	GMLN3002A
CABLE 6M TO JUNCTION BOX	GMKN4192A
CABLE 4M TO JUNCTION BOX	GMKN4193A
CABLE 2M TO JUNCTION BOX	GMKN4194A

MTM800 Enhanced - Hands Free Kits

Description	Nomenclature
PUSH BUTTON PTT	RLN4857A
GOOSE NECK PTT (only MTM800)	RLN4858A
ACCESSORY CONNECTION KIT	GMBN1021A

Microphones & Speakers

Description	Nomenclature
FIST MICROPHONE	GMMN4063A
DESK MICROPHONE	GMMN4064B
VISOR MICROPHONE DIRECTIONAL (for installations with high background noise and where the visor microphone is sheltered from the outside wind)	GMMN4065A
EXTERNAL SPEAKER 13 W	GMSN4066A
COMPACT EXTERNAL SPEAKER 5 W	GMSN4078A

Miscellaneous

Description	Nomenclature
DISMANTLING TOOL	6686119B01
ANTI-TAMPER LABEL	5466516B01

MTM800 Enhanced - Installation Kits

Description	Nomenclature
High Profile Mounting Trunnion	GLN7317A
Low Profile Mounting Trunnion	GLN7324A
Accessory connector kit	GKN6272A
External alarm relay	GMCN4060A

Description	Nomenclature
Ignition Switch Cable	HKN9327BR
Key Lock Mounting Kit	RLN4779A
Desktop tray without loudspeaker	GLN7318A
Desktop tray with loudspeaker	GLN7326A
SPEAKER EXT.CABLE	GMKN4084A

MTM800 Enhanced - Desktop Power Supply

Description	Nomenclature
DESKTOP POWER SUPPLY	GPN6145A
Power cable (power supply to desktop mobile)	GKN6266A
US linecord (3060665A04) packaged	NTN7373AR
Euro linecord (3060665A05) packaged	NTN7374AR
UK linecord (3002120F02) packaged	NTN7375AR
Battery power cable 3m, 10A fuse AWG 12	GKN6270A

MTM800 Enhanced - Programming

Description	Nomenclature
Programming cable (RIBless)	GMKN4067B
I85S USB DATA CABLE W/IN LINE PWR (MTM800 ENH)	NNTN4007B
CABLE, Control Head PROGRAMMING via USB (GCAI)	HKN6184A

MTM800 Enhanced - UCM Module

Description	Nomenclature
MTM800 UCM UPGRADE KIT	GMLN4218A
MTM800 MACE-UCM UPGRADE KIT AES128	GMLN4562A

MTM800 Enhanced - GPS Upgrade Kit

Description	Nomenclature
MTM800 GPS UPGRADE KIT	GMRG4219A
LBL,CONFIG,,,,PE,GMLN4195A MOUNTED	5466571B01
MTM800 retrofitting GPS board - Installation Manual	6866539D14

MTM800 Enhanced - Publications

Description	Nomenclature
MTM800 ENH BASIC USER GUIDE EMEA (English, German, French, Spanish, DUTCH, ARABIC)	6866539D24
MTM800 ENH BASIC USER GUIDE EMEA (English, Russian, Italian, Polish)	6866539D34
MTM800 ENH BASIC USER GUIDE EMEA (English, DANISH, Swedish, Norwegian, PORtUGUESE BRAZ)	6866539D35
MTM800 ENH BASIC USER GUIDE EMEA (English, HUNGARIAN)	6866539D48
MTM800 ENH FEATURE USER GUIDE, ENGLISH Available on Motorola Online (MOL)	6866539D25
MTM800 ENH BASIC SERVICE MANUAL, ENGLISH Available on MOL	6866539D28
MTM800 ENH 350-390 MHz Detailed SERVICE MANUAL, APAC REGION Available on MOL	6866539D33
MTM800 ENH 380-430 MHz DETAILED SERVICE MANUAL, ENGLISH **NOT** Available on MOL - FOR INTERNAL USE ONLY	6866539D29
MTM800 ENH 410-470 MHz DETAILED SERVICE MANUAL, ENGLISH **NOT** Available on MOL - FOR INTERNAL USE ONLY	6866539D31
MTM800 ENH 806-870 MHz DETAILED SERVICE MANUAL, ENGLISH **NOT** Available on MOL - FOR INTERNAL USE ONLY	6866539D32
MTM800/MTM800 ENH PRODUCT INFORMATION MANUAL Available on MOL	6866537D87
MTM800 ENH DATA TERMINAL USER GUIDE, ENGLISH	

6 Ordering the Software Enablement Kits

General Information

Each kit number ordered will provide one dongle for the customer with a certain number of counters set according to the number of software option ordered.

This kit number is applicable to both new orders or existing fielded terminals which required software enablement.

The WAP Software Enablement Kit is not applicable to the MTM800 Enhanced Mobile Terminal.

Note: *The following features will be sold in MR5.7.*

- GPS
- Multislot Packet Data (MSPD)
- WAP
- Enhanced Security (enclosing: GCK, GCK OTAR, DMO SCK, SCK OTAR)
- Permanent Disable (KILL\UNKILL)
- Call-out

6.1 Software Selling - Tools and Mechanisms

For MR5.7 the chosen approach is a dongle with counters for each one of the features. The features are enabled at the same time the customer programs the radio. This will happen in one operation.

- A dongle is connected to the PC which is used to configure the TETRA terminal.
- The dongle has a counter for each of the features.
- The dongle counters are “charged” as per what the customer has ordered/purchased (e.g. MSPD in 100 TETRA terminals.
- Every time a feature is enabled in a terminal the dongle counter is decreased for the feature in question.

Note: *For activating the appropriate features please refer to chapter “Customer Programming Software”, paragraph “Enable Features” or refer to the CPS Start-Up Manual ((P/N 6802974C10_) on the CPS CD for more information on how to implement the supplied software.*

Ordering Requirements

6.2 How to Place an Order for a Software Enablement Kit

1. Order the Main Kit GM0127
2. Select the software feature option from the following. You can select more than 1 feature for each Main Kit:
   - QA00176_ - Option to enable Multislot Packet Data (MSPD) feature. Order quantity equaling number of models requiring MSPD enablement.
   - QA00175_ - Option to enable WAP feature. Order quantity equaling number of models requiring WAP enablement.
   - QA00771_ - Option to enable Enhanced Security feature. Order quantity equaling number of models requiring Enhanced Security enablement.
   - QA01003AA- Option to enable Permanent Disable feature. Order quantity equaling number of models requiring Permanent Disable enablement.
   - QA01089AA - Option to enable Call-Out feature. Order quantity equaling number of models requiring Call-Out enablement.

6.3 Example Order

The following order is required:

- 20 radios
- 10 MSPD Software enables

To accompany the 20 radios (ordered according to relevant price page) the following Software Enhancement Kit should be ordered:

- 1 dongle (1 x GM0127_)
- 10 MSPD (10 x QA00176_)

Note: *The CPS will not allow additional radios to be enabled with GPS or MSPD (unless further Software options are ordered).*

Chapter 2

SERVICES AND FEATURE DESCRIPTION

1 Introduction

This chapter covers the services and functionality of the Motorola MTM800 Enhanced Terminals based on the MR5.7 software release.

The functionality is described in enough detail to ensure that both the customer and developer are clear what is being delivered, taking into account customer need as well as implementation considerations and constraints.

This chapter contains a high level description of the agreed services and functionality of the MTM800 Enhanced terminals for MR5.7, including those features that were supported in previous releases.

The Man-Machine Interface (MMI) requirements are specified in this document in general terms.

The document will specify the functionality required to operate on the Dimetra IP SwMI, as well as the functionality required to operate on other TETRA SwMI's that comply with the MoU interoperability documents [Ref 11] through [Ref 17].

1.1 Features Overview

1.1.1 Trunk Mode Operation (TMO)

- Group call
- Talkgroup Scanning & Priority monitor
- DGNA (Individually addressed + group addressed)
- Emergency group call (and Hot Microphone)
- Half-duplex private call
- Full-duplex private call
- Telephone call (PSTN /PABX)
- SwMI Authentication of MS, and made mutual by MS
- Air Interface Encryption - Static Cipher Key
- Temporary/Permanently Enable/Disable
- AT commands (SDS only)
- Short Data Services (Status, Text Message)
- Targeted SDS Status (to SSI) - (for IOP)
- SDA Remote Listening & Busy User Preemption (Clear builds only)
- Multi-Network Operation (Selected network only)
- Packet Data (Multi Slot)
- TNP1
- Call-Out
- SDS - Store & Forward
- Transmit Inhibit (RF Sensitive Area Mode)
- Support for Dimetra - IP Release 5.2

- Ambience Listening
- BUP & RL
- Pre-emptive Priority Call
- Mobility Enhancements
- Dynamic Key Encryption
- Broadcast Call
- On Hook Mode for Group Calls using external speaker.
- Horn & Light

1.1.2 Direct Mode Operation (DMO)

- DMO Group Call
- DMO Private Call
- DMO Gateway - Cleartone Gateway
- DMO Repeater Compatibility
- DMO Group Emergency Call
- DMO Static Key Encryption (DMO SCK)
- Short Data Services (Status, Text Message)
- AT commands (SDS only)
- DMO/TMO Emergency Switching
- DMO Inter - Networking - gateway functionality including open group and open network calls.

Also covered are mobility, security, group management and the user interfaces that both support and enhance the user services.

1.1.3 MTM800 Enhanced Platform Features:

- Built-in GPS receiver
- UCM capable
- End-to-End Encryption (E2E)

1.1.4 MMI Features

- High/Low Audio Toggle Switch
- Individual Call Dialing Scheme
- Alphabetic Search

1.1.5 General Features:

- High Assurance Boot (HAB) memory access protection (see Paragraph 11.8 "High Assurance Boot (HAB)")
- GPS location reports and display (see Paragraph 15 "GPS Support")
- Favorite talkgroups (see Paragraph 2.1.4 "My Favourite Groups")
- 2048 TMO talkgroups; 1024 DMO talkgroups
- 225 address book entries
- Super groups of scan groups (see Paragraph 14.1.5 "Group Addressed DGNA")
- Covert Mode

1.1.6 IOP features:

- DCK Forwarding (see Paragraph 11.3.3 "Derived Cipher Key Encryption DCK, Common Cipher Keys CCK and Group Cipher Keys GCK (Class 3)")
- CCK per LA (see Paragraph 11.3.3 "Derived Cipher Key Encryption DCK, Common Cipher Keys CCK and Group Cipher Keys GCK (Class 3)")
- Background scanning (see Paragraph 9.4 "Roaming")
- Announced Type 2 handover (see Paragraph 9.4 "Roaming")
- Emergency Private call (see Paragraph 5.2 "Emergency Private Call")
- Call modifications (see Paragraph 5.2 "Emergency Private Call")
- SwMI Initiated attachments (see Paragraph 2.2.15 "SwMI Initiated Group Attach/Detach")
- SwMI controlled groups (see Paragraph 2.2.15 "SwMI Initiated Group Attach/Detach" and Paragraph 14.1.1 "Adding a Talkgroup")

1.2 References

The following documents may be referred to in this document:

1.2.1 TETRA Standard Documents

[Ref 1] TETRA: AI
ETSI EN 300 392-2 TETRA V+D; Part 2 Air Interface, Edition 2, V2.4.2 (2004-02)

[Ref 2] SDSTL draft 0.13

[Ref 3] TETRA: Security
ETS 300 392-7, TETRA V+D Part 7: Security, Version 2.1.26 (2004-06)

[Ref 4] PEI
ETS 300 392-5 TETRA V&D; Part 5: PEI, Version 1.2.1 (2003-11)

[Ref 5] SS-DGNA S3
ETS EN 300 392-12-22 TETRA V+D; Part 12 SS Stage 3; Subpart 22: DGNA, Version 1.2.1 (2004-02)

[Ref 6] SS-AL S3
ETS EN 300 392-12-21 TETRA V+D; Part 12: SS Stage 3; Sub-part 21: AL, Version 1.2.0 (2004-06)

[Ref 7] SS-PPC S3
ETS EN 300 392-12-16 TETRA V+D; Part 12: SS Stage 3; Sub-part 16: PPC, Version 1.2.0 (2004-05)

[Ref 8] TETRA-Address-guide
TETRA 300-5 Designers Guide Part 5; Dialing addressing (first edition, July 1998)

[Ref 9] DMO P1
TETRA Technical Requirements for DMO; Part 1: General Network Design, ETS 300396-1, March 1998

[Ref 10] DMO P3
ETS EN 300 392-6 TETRA Technical Requirements for DMO; Part 3: terminal to terminal Air Interface Protocol, Version 1.1.21 (2004-06)

1.2.2 MoU TIP Documents

[Ref 11] TIP-Core
TTR 001, TETRA Interoperability Profile - Part 1 (Core), ver 4.8.1, Feb 2003

[Ref 12] TIP SDS
TTR 001-2, TETRA Interoperability Profile - Part 2: Short Data Service, ver 1.0.1, Aug 2001

[Ref 13] TIP Auth
TTR 001-04 TIP - Part 4 - Authentication, Version 2.0.0 (April 2003)

[Ref 14] TIP PD
TTR 001-5 TETRA Interoperability Profile Version 3 - Part 5: Packet Data, ver 1.3.0

[Ref 15] TIP-SS-AL
prTTR 001-09 TIP Version 5 - Part 9 - Ambience Listening Ver 1.0.3, Jan 2002

[Ref 16] TIP AIE
TTR 001-11 TIP Version 5 - Part 11 - Air Interface Encryption Ver 1.0.0, Dec 2001

[Ref 17] TIP Disable
TTR 001-13 TIP Version 5 - Part 13 - Enable/Disable Ver 1.0.0, Jan 2002

1.2.3 Other Standards

[Ref 18] RFC: IP
Internet STD 5, RFC 791, Internet working Protocol (IP)
see http://www.isi.edu/in-notes/rfc791.txt

[Ref 19] RFC: PPP
Internet RFC 1661, Point-to-Point Protocol (PPP)
see http://www.isi.edu/in-notes/rfc1661.txt

[Ref 20] RFC: HDLC
Internet RFC 1662, PPP in HDLC-like Framing”
see http://www.isi.edu/in-notes/rfc1662.txt

[Ref 21] RFC: UDP
Internet RFC 768 User Datagram Protocol. J. Postel. Aug-28-1980
see http://www.isi.edu/in-notes/rfc768.txt

[Ref 22] RFC: PAP/CHAP
Internet RFC 1334 "PPP Authentication Protocols"
see http://www.isi.edu/in-notes/rfc1334.txt

[Ref 23] RS 232 Standard - "EIA232E - Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange" published by the Electronic Industries Association,
see http://www.eia.org

1.2.4 Miscellaneous

[Ref 24] Cleartone GW Spec
Call protocol/procedure for DM-GATEWAY and DM-REPEATER by Cleartone Telecoms; Issue 1.1 Jan-2001

1.3 System Support

The terminal operates on the Dimetra IP 5.x and 6.x releases and and Compact TETRA release 2 and release 3. It will also operate on previous versions of Dimetra-P - from Release 3.1 and on.

The terminal is designed to operate optimally on the Dimetra IP system, but will also operate properly on Nokia systems, and all SwMIs that comply with IOP TIP documents [Ref 11] through [Ref 17].

1.4 Definitions and Acronyms

AL	Ambience Listening
ASSI	Alias Short Subscriber Identity
AT	ATtention; this two-character abbreviation is always used to start a command line to be sent from DTE to terminal
ATG	Announcement TalkGroup
CCK	Common Cipher Keys
CHAP	Challenge-Handshake Authentication Protocol
CLIP	Calling Line Identification Presentation
CLIR	Calling/connected Line Identification Restriction
CPS	Customer Programming Software (terminal Provisioning tool)
DCK	Derived Cipher Key
DGNA	Dynamic Group Number Assignment
DMO	Direct Mode Operation
DTE	Data Terminal Equipment (External device attached to radio)
ESN	External Subscriber Number
GCK	Group Cipher Keys
GCKN	GCK Number
GCVK-VN	GCK Version Number
GSM	Global System for Mobile communications
GSSI	Group Short Subscriber Identity
GTSI	Group TETRA Subscriber Identity
GPS	Global Positioning System
ICMP	Internet Control Message Protocol
IP	Internet Protocol
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ISDN	Integrated Services Digital Network
ISSI	Individual Short Subscriber Identity
ITSI	Individual TETRA Subscriber Identity
IMSI	International Mobile Subscriber Identity
LIP	Location Information Protocol (ETSI standard)
LMN	Land Mobile Network
LRRP	Location Request Response Protocol (non ETSI standard)
MCC	Mobile Country Code
MM	Mobility Management
MMI	Man Machine Interface
MNC	Mobile Network Code
MNI	Mobile Network Identity
MO	Mobile Originated calls
MS	Mobile Station
MSPD	Multi Slot Packed Data
MT	Mobile Terminal
MT2	Mobile Termination Type 2 (Providing TETRA stack)
MTU	Maximum Transmit Unit
PABX	Private Automatic Branch eXchange
PAP	Password Authentication Protocol

PD	Packet Data
PDP	Packet Data Protocol
PDCH	Packet Data Channel
PDU	Protocol Data Unit
PEI	Peripheral Equipment Interface
PPC	Pre-Emptive Priority Call
PPP	Point to Point Protocol
PSTN	Public Switched Telephone Network
PTT	Push-To-Talk
PUK	PIN Unblocking Key
RF SA	Radio Frequency Sensitive Area
RFC	Request For Comment (Internet 'standard')
SCK	Static Cipher Key
SCKN	SCK Number
SCVK-VN	SCK Version Number
SDMO	Secure DMO
SDS	Short Data Service (this includes SDS-Status, and SDS user-defined-data 1,2,3 and 4)
SDTS	Short Data Transport Service
SFD	Service and Feature Description
SMS	Short Message Service
SNDCP	Sub-Network Dependent Protocol
SS	Supplementary Service
SwMI	Switching and Management Infrastructure
TE2	Terminal Equipment Type 2 (Connected via serial link to MT2)
TEA	TETRA Encryption Algorithm
TEI	TETRA Equipment Identity
TETRA	TErrestrial Trunked RAdio
TNP1	TETRA Network Protocol 1, radio control protocol on the PEI
TIP	TETRA Interoperability Profile (an agreement between TETRA manufacturers that specifies TETRA signaling options to be used)
TNP1	TETRA Network Protocol 1, radio control protocol on the PEI
TXI	Transmit Inhibit
UDP	User Datagram Protocol
USSI	Un-exchanged Short Subscriber Identity
(V)ASSI	(Visitor) Alias Short Subscriber Alias Identity
GSSI	Group Short Subscriber Identity
VGSSI	Visitor GSSI

2 Group Call (TMO)

The group call is defined, in the TETRA Standard, as the normal operating mode and is a point to multi-point operation. The terminals involved are only able to use half duplex call procedure which means the user has to press and hold the Push-to-Talk Button during transmitting.

2.1 Terminal Ergonomic Features

2.1.1 Group Mode

Before a terminal is able to send and receive Group Calls it will automatically switch to the group mode of operation when dialing for call setup and alert the user to the incoming group call.

Group Calls are only cleared down by the call originator or if the call timer expires.

Benefits:

- ❏ Instant access – push PTT and talk, release to listen
- ❏ ”No fuss” easy & fast to use

2.1.2 Programmable Talkgroups

The terminal is capable of storing 2048 Talkgroup numbers (GSSI - Group Short Subscriber Identity) in 128 ranges or lists. In Group Mode a single range is always active, offering the user up to 16 Talkgroups. Talkgroups may be repeated in different ranges. Both the Ranges and Talkgroups can have names/aliases to ease recognition for selection when being scrolled by the user.

Benefits:

- ❏ Whatever the application and size of the system enough talk groups are available

2.1.3 Talkgroup Ranges

It is possible to provision the terminal to organize the talkgroups into ‘“ranges“. A talkgroup can then be chosen by first choosing a range and then a talkgroup within the range. Up to 128 ranges can be provisioned, with up to 16 talkgroups in each range.

Benefits:

- ❏ Allows ease of use -arrangement of important talk groups - otherwise up to 2048 Talkgroups must be scrolled through.
- ❏ Logical arrangement for splitting up into departments or functional teams provides an easier overview

Note: Via a CPS, a flag can be set to automatically scroll range1 to range2 ... or cycle existing range only. The range definitions cannot be altered by the terminal user via the MMI.

Note: A new feature enables talkgroup search via keypad digit entry.

2.1.4 My Favourite Groups

This user friendly feature enables a user to create a ‘Personal Range’ of own talkgroups from pre-programmed talk groups within the terminal and is saved in the terminal during power down.

It is a shared feature for both TMO & DMO operating modes and has a capacity of 128 talkgroups for the MTM800 Enhanced.

2.1.5 Talkgroup Selection

Selection of a Talkgroup is done via up/down navigation buttons

2.1.6 Receive-only Talkgroups

It is possible to provision a group to be receive-only. The group can be selected, but the terminal will not allow the user to initiate a call to this group.

2.1.7 Non Selectable Talkgroups (Hidden Talkgroups)

It is possible to programme non selectable talkgroups, these Talkgroups are not seen by the user during scrolling, are non-selectable, are programmed as receive only and are only seen during a received call.

Benefits:

- ❏ Non Selectable Talkgroups can help to shorten confusingly long Talkgroup Lists in the terminal and therefore ease operation
- ❏ Groups where the user is not allowed to initiate a call (e.g. announcement TGs) are hidden and do not confuse the user

2.1.8 Audio Input and Output

Incoming group call audio will be routed to an external accessory/speaker or Telephone Style Handset.

2.1.9 Talk Time Limit

The terminal can limit the amount of time the user can continue to talk in a group call according to a provisioned value defined in the CPS. The user will be warned a short time before the talk time expires.

2.1.10 Receiving a Group Call

When the terminal is in group mode, it is able to receive group calls without any user intervention.

When the terminal receives an incoming group call, it may be signalled by a short alert tone from the loudspeaker. This will be followed by the speech.

No user action is needed to clear the call which is cleared by the call owner (normally the SwMI).

2.1.11 Emergency Group Call

Emergency Group call is described in Section 5 "Emergency Operation (TMO)".

2.1.12 Talkgroup Scanning

This is a user selectable option that enables 1 of 20 scan lists to be selected. Each scan list may contain up to 20 talkgroups that will be monitored for activity. If any activity is detected the terminal will ‘land on’ the talkgroup and the terminal will join the call, upon call completion the terminal resumes scan operation.

Features and Benefits:

- ❏ Ability to monitor more than one group at a time
- ❏ Allows the user to be in contact with a number of talk groups – calls are not missed
- ❏ Number of talkgroups in a scan list has been enhanced to 20 specifically for transport applications
- ❏ CPS programming allows users to create/modify scan lists.
- ❏ Scan On/Off is user selectable.
- ❏ User can ‘cancel’ a scan call if not important to focus on other activities
- ❏ As Emergency Mode has highest priority, TG Scanning is disabled when emergency mode is entered - this enhances security.

- ❏ Talkback function selection - this determines whether or not a user is allowed to Tx on a scan call.

2.1.13 Priority Monitor

Whilst active in a call, a terminal may receive a ‘call setup’ from a different group and based on call priority, it will decide whether to ignore the new call or accept it . If the new call is of higher priority the terminal will drop the active call and select the new call.

The terminal can be programmed to not immediately join the new higher priority call, in which case it will display the new call to the user who then makes the descission either to accept or reject it.

Benefits:

- ❏ Priority monitor adds a 3 level priority to the scanned groups – even when engaged in a call a higher priority call is not missed.
- ❏ Any TalkGroup/Announcement Talk Group can be provisioned as Priority Group.

2.1.14 Broadcast Call (Also known as ‘Site Wide Call’)

When a Broadcast Call is setup, it takes precedence over any call that has the same or lower priority. It allows a console to communicate with all Terminal Users located at one or more sites. A terminal will join the call, no matter what group ID it has selected and ‘Broadcast’ is displayed as the group alias. As this type of call is receive only, the terminal prevents the user from transmitting during the call.

Benefits:

- ❏ Ensures that in a crisis you can mobilise everybody on those sites in an instant.
- ❏ A wide range of groups and organizations are reachable via Site Wide Call
- ❏ Can be set up as an Emergency call or Group Call with Late Entry
- ❏ Easy management via SWTG (Site Wide Talk Groups)
- ❏ Important that communication is confined to the target area, only the specific critical area needs to be made aware
- ❏ Important feature for Transit segment, e.g. if one or more stations need to be evacuated due to a fire or a bomb threat

2.2 Air Interface - Network Supported Features

The following features are supported by Motorola Dimetra Networks and may not be supported by other networks.

2.2.1 Group Call Setup

The terminal is able to make and receive group calls to and from other TETRA terminals with half-duplex speech capability. This call type uses TETRA group call signalling with direct set-up for incoming and outgoing calls. Group calls are owned and cleared down by the infrastructure.

Direct Setup – User requests call setup (selects address and presses PTT), gets grant by the infrastructure (grant tone when enabled) and presses PTT to talk.

Benefits:

- ❏ Instant access to selected group - within <200ms (when resources available and not queuing)
- ❏ Just pressing PTT when starting communication with current selected Talk Group

2.2.2 Talking Party Identification (TPI)

This feature enables the identity of the calling terminal to be displayed on the called terminals.

Benefits:

- ❑ The user always knows who's talking before answering the call - this enables preparation or decision to accept or reject the call

2.2.3 Call Restoration

Dependent on available traffic channels, this feature enables a terminal to rejoin a group call as it moves from one cell coverage area into another cell coverage area, this operation is seamless.

2.2.4 Announcement Talk Group (ATG - also called Multi Group)

This is a special type of group that is logically a group in its own right, but also may contain subgroups. When selected, the terminal monitors the traffic received for the Announcement Group and subgroups, but if a subgroup has been selected, the terminal will monitor traffic received for the announcement group as well as the traffic received for any of the associated subgroups.

The terminal does not monitor the active scan list groups when an announcement group is selected.

When the user selects one of the subgroups of the announcement group, the traffic for the subgroup is monitored as well as the traffic for its announcement group (but not other subgroups).

The terminal can be programmed to prevent user call initiation or talk back on announcement talk groups.

This is a Motorola Dimetra ONLY feature (not in Standard or TIP)

Announcement Talk Group compared to Talkgroup Scanning:

- Similar to Scanning in some ways (from MS perspective)
  - Rx hold applies to ATG operation
  - Scanning mode (Presentation/Forced) applies to ATG operation
  - Priority Monitor applies to ATG calls - Announcement group has the highest group priority
- Unlike scanning in other ways
  - Flag in the terminal indicates if user is allowed to start ATG call
  - But 'Talkback flag' does not apply to ATG calls (always enabled)
  - ATG operation applies even in Emergency mode
- ATG association set by CPS and cannot be changed by MS user
- Interaction
  - Scan list is disabled when ATG is selected
  - ATG cannot be a member of a scan list

Features and Benefits:

- Scanning of a second Talkgroup over the whole network. ATG is a form of active scanning as opposed to passive scanning where another user on the scanned talkgroup has to be present on the same site for the user to be offered the scanned talkgroup.
- Establishes a group hierarchy to better manage monitoring of groups
  - Announcement group (ATG) 'contains' associated groups
- When ATG is selected

- All associated groups are also monitored (‘scanned’)
- Normal TG scan list is disabled

- When group associated with ATG is selected
  - ATG also monitored (‘scanned’)
  - Normal TG scan list remains active

2.2.5 Temporary Group Address

When a terminal initiates a group call, the system may assign the call to a temporary group, for the call duration only, and terminals will monitor all signalling addressed to this temporary group.

Similarly terminals support assignment of an incoming call to a temporary group address.

The terminal can support a temporary group address assigned by the SwMI which is only valid for the lifetime of the call. Thus, if the terminal initiates a group call on the selected group, and the SwMI assigns the call to a temporary group, the terminal can monitor all signalling addressed to this temporary group as long as the call is active.

The terminal can support assignment of an incoming group call to a temporary group address.

2.2.6 Group Attachment

Whenever a user selects a new Talkgroup the terminal sends an ‘amendment’ attachment message to the system. This tells the system what Talkgroup the terminal is now actively monitoring and should now receive all call setup procedures for this group.

If a scan list has been selected and Talkgroup scanning is enabled by user action, this message will be sent for all Talkgroups in the active scan list.

2.2.7 Late Entry

Terminals may miss the initial group call setup for various reasons and the system, by repeatedly sending the group call set up as a ‘Late entry Broadcast’ on the control channel for the call duration, enables the terminals to join the call at a later time.

The terminal will join a group call setup which contains a notification element indicating Late Entry Broadcast. During Tx (Not hang time) SwMI sends periodic D-SETUPs on MCCH. However, it will not differentiate between this and a regular call setup in any way.

Benefits:

- ❑ When used was out of range or just has finished another call then the terminal does not miss an ongoing call of the selected Talk Group

2.2.8 Call Ownership

The terminal accepts call ownership of a group call. When the terminal is the call owner it will send U-DISCONNECT when leaving the call.

2.2.9 Transmit Request Queueing

Whilst another user is talking during an ongoing group call and “PTT during received Group Call” codeplug is enabled, a user may request to transmit by pressing and holding the PTT button. The system will see this action and inform the user that the request has been queued.

While the MS is in Emergency Mode the transmission request is not ignored and the queuing is ignored.

If the user releases the PTT button, the terminal sends a message to the system withdrawing the request.

2.2.10 Transmission during the Group Call

Whilst another user is talking during an ongoing group call and “PTT during received Group Call” codeplug is disabled, a user cannot transmit by pressing and holding the PTT button.

The MS ignores the request to transmit without any indication. The user has to release and then press again the PTT button to re-initiate a transmission request.

While the MS is in Emergency Mode the transmission request is not ignored.

2.2.11 Call Restoration in Group Call

If the terminal roams to a new cell during a group call, it will attempt to continue the call on the new cell, using TETRA cell reselection and call restoration procedures.

If the terminal roams while the user is the transmitting party in the group call, and it is possible to perform announced cell reselection, announced cell reselection will be employed as described in Paragraph 9.4 "Roaming" and call restoration procedures will be performed in the new cell.

If the user is not the transmitting party, Unannounced cell reselection will be employed, followed by call restoration procedures.

2.2.12 Temporary Group Address

The terminal supports a temporary group address assigned by the SwMI which is only valid for the lifetime of the call. Thus, if the terminal initiates a group call on the selected group, and the SwMI assigns the call to a temporary group, the terminal will monitor all signalling addressed to this temporary group as long as the call is active.

The terminal supports assignment of an incoming group call to a temporary group address.

2.2.13 Late Entry

The terminal assumes that the SwMI sends repeated setup messages (’late entry’) on the main control channel. Thus, in certain circumstances (such as when receiving a priority monitor call if provisioned as “Presented” - See Paragraph 2.1.13 "Priority Monitor") it will ignore a group call D-SETUP PDU on the assumption that it can join the call at a later time.

The terminal will join a group call setup which contains an SS-LE notification element indicating Late Entry Broadcast. However, it will not differentiate between this and a regular call setup in any way.

Note: Acknowledged Late Entry, and Late Entry Paging is not supported.

2.2.14 User initiated Group Attachment

When the user changes the selected talkgroup, the terminal will initiate an attachment to the SwMI, detaching the old group and attaching the new Talkgroup.

All group attachments sent by the terminal are sent with “attachment mode” of “amendment” or “detach all...” on a case-to-case basis depending on which form will cause less bits to be sent over the air interface.

When the user selects a scan list and turns scanning on, the terminal will send a group attachment request to attach the scan groups in addition to the selected group. Similarly, when the user selects an ATG, the terminal will send an attachment of the ATG as the selected group along with the attachment of the associated groups as scan groups. If a group associated with an ATG is selected,

the terminal will send an attachment of the associated group as the selected group along with the attachment of the ATG as a scan group in addition to other scan groups it is scanning.

The TETRA TIP provides a facility by which the terminal can send a status message to the SwMI to turn scanning off and on rather than detaching and reattaching the groups in order to save air interface signalling.

If the terminal is provisioned with this option, when the user turns scanning off the terminal sends U-MM-STATUS (Status Uplink set to 0x20, and Scanning On/Off set to OFF (1)). In this state the terminal does not monitor any groups other than the selected group (this includes user scan groups, super groups of scan groups, SwMI scan groups, ATG when an associated group is selected and associated groups when an ATG is selected). If the user subsequently turns scanning on, the terminal will send U-MM-STATUS (Status Uplink set to 0x20, and Scanning On/ Off set to ON (0)). and the terminal will begin again monitoring all attached groups.

If the terminal is not provisioned with this option, the user will only have an option to deselect the active user scan list, but will not be able to turn (all) scanning off. Deselection of the user scan list will cause a group detachment of the user scan list groups to be sent to the SwMI; but the terminal will continue to scan all other groups (such as ATG associations).

2.2.15 SwMI Initiated Group Attach/Detach

If the terminal receives a SwMI initiated attachment for the group which is already currently selected the terminal will accept the attachment and keep the group selected. If the Class of Usage (CoU) received is not “selected”, that CoU will be applied when the group is deselected.

If the terminal receives a SwMI initiated attachment for a group in the currently active user scan list, the attachment will be accepted. If it is for a group that is not in the currently the active scan list, the attachment will be rejected. If it is for a group that is not in the currently active user scan list, the attachment will be rejected.accepted and added to a separate scan list that will hold up to 10 such groups.

SwMI initiated detachment is always accepted by the terminal. If the detachment is for the selected group, the display will indicate to the user that no group is currently selected. If the detachment is for a group that is in the user scan list, the group will remain in the list, but will not be monitored. If the detachment is for a group that is in the “SwMI controlled” list, it will be removed from that list.

3 Private Call (TMO)

This is a call between two terminals and may use either full duplex or half duplex call procedures dependent on call setup by the calling terminal user.

3.1 Terminal Ergonomic Features

3.1.1 Terminal ID

It is possible for the terminal user to view the terminal’s ID (ISSI - Individual Short Subscriber Identity) via the menu functionality.

3.1.2 Dialing Methods

The terminal supports the following methods for Private Call setup:

- Direct Dial

- Scrolling the address book
- Alpha Recall
- Last Number Dialled

Direct Dial

The number of the called terminal is directly entered via the keypad.

Scroll Method

The terminal scroll buttons are used to scroll backwards and forwards through the address book.

Alpha Recall

Phone numbers can be found in the address book using the Alphabetic search feature.

Last Number Called

When entering private mode, the last number called is display, press PTT to redial the number.

3.1.3 Initiating a Private Call from the Contact Book

After defining the target address, the user can initiate the call in 1 of 2 ways:

1. Pressing the PTT button will initiate a half duplex call.
2. Pressing the <send/end> button will initiate a full duplex call. This button is also used to clear down both types of call.

3.1.4 Short Number Dial

This enables a user to enter only part of a number for private call setup.

3.1.5 Receiving a Private Call

Incoming private calls can be either half-duplex or full-duplex. On receipt of a direct call setup (half duplex), the terminal will immediately join the call and sound the received audio. Receiving a full-duplex call setup will cause the terminal to ring using the selected phone ring style or will cause the terminal to vibrate. Once the user takes the call by pressing <send/end>, the full-duplex call is established.

3.1.6 Talk Time limit

In a half-duplex call, the terminal will limit the amount of time the user can continue to talk (= transmit) according to a provisioned value. The user will be warned a short time before the talk time expires.

Benefits:

- ❑ Prevents blocking of a Talkgroup when the Push to Talk button hangs on a terminal by accident or if a user intentional tries to block this group.

3.1.7 Terminating a Private Call

The user will be given the ability to terminate a half-duplex or full-duplex private call by pressing the <send/end> key.

3.2 Air Interface - Network Supported Features

3.2.1 Call Restoration in Private Call

This feature enables a terminal to rejoin the call as it moves from one cell coverage area into another cell coverage area and dependent on available traffic channels, this operation is seamless.

3.2.2 Caller Line Identity Presentation CLIP

The calling party TETRA identity may be transported as part of the incoming individual call set-up signalling. If the identity can be interpreted as a short number, the short number will be displayed to the user. In addition, if the number is programmed in the terminal address book, the name associated with that number will be displayed as well. If the calling party identity is not present in the call set-up signalling, the terminal will display a blank line in place of the missing identity.

Benefits:

- ❏ The user always knows who's calling
- ❏ If caller is programmed in terminal's list the alias is displayed

4 Phone Call (TMO)

This is a system feature that enables terminal users to dial telephone numbers and have a full duplex, one to one call with the called party.

To achieve this the system must have connectivity to PSTN/PABX networks.

4.1 Phone Modes

There are 2 types of Phone Mode, user selectable via the Mode Selection button.

- Phone, which is connectivity to a (public) PSTN network and the user dials a full telephone number.
- PABX, which is connectivity to a local (private) telephone network, i.e. an office, where the numbers dialled will be addressed to the defined PABX gateway address.

One PSTN and one PABX Gateway ID (access to a telephone network) can be stored in a terminal.

4.2 Terminal Ergonomic Features

4.2.1 Dialing Methods

Supported by the terminal the following ways can be used to enter/recall a PSTN/PABX number for call setup (pending on the programming of the terminals):

- Direct Dial
- Scrolling
- One Touch Dial
- Last Number Redial

The number of the called terminal is directly entered via the keypad.

Benefits:

- ❏ Also unexperienced user are able to operate the TETRA terminal very similar to a GSM phone

4.2.1.1 Scroll Method

The terminal scroll buttons are used to scroll backwards and forwards through the address book.

Benefits:

- ❏ Usage similar to a GSM phones address book - Aliases make it easy to find the wanted destination

4.2.1.2 One Touch Dial

Keypad numbers 0 to 9 and function buttons can be programmed with an associated dial number and holding the button pressed for more than a pre programmed time will initiate the call. This feature is de-activated during Private, Phone and PABX calls.

Benefits:

- ❏ This is the fasted way to dial most wanted numbers

4.2.1.3 Last Number Redial

When entering phone mode, the last number called is display, press PTT to redial the number.

4.2.2 Ring Styles

The ring style and volume for incoming phone calls is pre-programmed in the terminal and can be modified by the user via the menu.

Benefits:

- ❏ The user can setup the tones and volumes in a way that it fits to the circumstances and environment the terminal is operating so that call will not be missed.

4.3 System Interaction

The terminal supports the following telephone related functions:

4.3.1 Initiating a Telephone Call

The terminal is only able to initiate calls to a PSTN/PABX using full duplex speech capability. Telephone calls can also be made between terminals using the Terminal - ISDN number as the called party number.

Half-duplex calls are not supported, if attempted, the system will try and update the call to full-duplex, but if the terminal is not programmed for ful-duplex calls, the call will be dropped.

4.3.2 Receiving a Telephone Call

Incoming telephone calls use on/off hook signalling. The terminal extracts the Gateway ID from the call set up signalling to determine which phone mode to enter, PABX or PSTN.

4.3.3 Call Restoration

This feature enables a terminal to rejoin the call as it moves from one cell coverage area into another cell coverage area and dependent on available traffic channels, this operation is seamless.

4.3.4 DTMF (One Press) Over Dialing

DTMF Overloading enables the user to send out DTMF/MFV tones and is only available when the terminal is active in a phone call. The DTMF feedback tone to the user is generated by the terminal.

DTMF tones are used to control e.g. an answering machine or a voice mail box.

4.3.5 Calling Line Identification Presentation (CLIP)

The calling party number is transported as part of the call set up signalling and is displayed on the terminal screen. If the number is held in the terminal's Address Book, then the name/alias associated with the entry will be displayed.

4.3.6 112/110/999 Dialing (pending on the infrastructure/SwMI)

If the user initiates a call to a phone number programmed as the emergency call number, the call is made with Call Priority 15 (Pre-emptive emergency priority) and the terminal display will not show anything special to indicate that it is in emergency mode.

4.4 Address Book

This contains the following 3 lists:

- **Private Call list** - this can have to 100 entries.
- **Phone List** - this can have to 100 entries.
- **PABX List** - this can have to 25 entries.

These contain stored numbers for user dialing.

5 Emergency Operation (TMO)

5.1 Emergency Group Operation

5.1.1 Emergency Group Mode

Emergency mode is entered when the user presses and holds the dedicated emergency button for a defined period of time.

On entry into the emergency mode any existing call or service other than the packet data service will either be aborted or cleared down.

In emergency mode, the terminal automatically rejects PSTN, PABX and private calls and does not monitor groups in the user selected scan list, but if an Announcement Talk Group (ATG) is the selected group, then the terminal monitors the groups associated with the ATG.

The terminal remains in emergency mode until user action exits the emergency mode and restores normal operation.

Benefits:

- ❏ Instant high priority access to the group
- ❏ Dispatcher is notified via emergency status
- ❏ The emergency group is notified of the emergency situation via a tone and the display
- ❏ ”Hot mic” enables the user to call for help without touching the terminal

5.1.2 Emergency Alarm

5.1.3 Emergency Alarm

If the terminal is provisioned with the emergency alarm feature, upon entry into emergency mode, the terminal will send an emergency alarm. This alarm is sent by sending a specially designated SDS status message to the address of the selected group. In addition, once the terminal is in emergency mode (and the terminal is provisioned with the emergency alarm feature), whenever the user presses the designated emergency button, an additional emergency alarm will be sent. The message can be dispatched both in TMO and DMO.

If Emergency Alarm is disabled, initiation of a new call by pressing emergency button during initiated Emergency Private call is disallowed. The radio shall notify the user by posting ‘Service Restricted’.

If Emergency Alarm is enabled:

- Emergency Address Type is Group and HotMic is disabled - emergency alarm is sent again

Emergency Address Type is Private - emergency alarm is sent again.

5.1.4 Emergency Group Call

The user is able to initiate an emergency group call in emergency mode and can participate in an emergency group call (initiated by others) in emergency mode or in regular group mode.

If a terminal receives an incoming group call with emergency priority, the display will show that an Emergency call has been received, and a special audio alert will be sounded.

The audio for an emergency group call will always sound through the speaker (high audio), even if the low audio is selected.

An Emergency Group Call is configured as **non-tactical** or **tactical**:

- A non-tactical call initiates on a talkgroup designated by the codeplug setting. After exiting from non-tactical emergency mode the terminal will be attached to the group that was selected before initiating the non-tactical call. When in non-tactical emergency mode, the user will not be able to switch talkgroups.

  DGNA messages have no impact during non-tactical emergency mode but only after exiting the non-tactical emergency mode.

- A tactical call initiates on the currently selected talkgroup.

5.1.5 Hot Microphone

This is a programmable option in the terminal. If enabled and the terminal enters emergency mode and sets up an Emergency Group Call, the microphone will automatically open and allow the user to talk without having to press the PTT button. Transmission is allowed for a pre-programmed period of time, after which the user must press the emergency button to restore the Hot Mic. functionality.

Pressing the PTT during the Hot Mic operational period will end the Hot Mic functionality and the terminal will revert to normal PTT voice operation.

If during an ongoing emergency call another terminal activates emergency within the same group the first emergency call will be interrupted after a pre programmed time. The hotmike function toggles between the first terminal and the second one in emergency stage triggered by the pending timers until the duration timers are expired. All timers are set by CPS.

During the hot microphone phase the gain of the microphone can be altered automatically.

Benefits:

- ❏ Instant high priority access to the group - no emergency call gets lost
- ❏ Dispatcher is notified via emergency status - can react immediately
- ❏ The emergency group is notified of the emergency situation via a tone and the display - the are immediately aware of it and can start to investigate for help
- ❏ ”Hot mic” enables the user to call for help without touching the terminal
- ❏ Increased microphone gain during emergency phase enables the user to talk without being close to the terminal
- ❏ Also members of the Talk Group can gain more information about the situation by listen of background noises

5.2 Emergency Private Call

Emergency Call can be provisioned to be a Half-Duplex or Full-Duplex private call. If Emergency Call is provisioned as private call, when the user presses the emergency button/key, the terminal will initiate a private call with emergency call priority to the provisioned address. No emergency alarm is sent and there is no emergency mode; the emergency state (all user indication and rejection of other services) ends as soon as the call ends.

6 Direct Mode Operation (DMO)

DMO enables a terminal to use the group call functionality to talk to other terminals without using a network. The terminals must all be in DMO prior to the call set up and communication is possible using DMO Supported Features.

6.1 DMO Mode

The user is able to switch between DMO and TMO via a predefined button on the terminal.

There is only the Group mode of operation available to the user.

All menu items are displayed, but some menu functionality are not be selectable.

The RSSI level is displayed when the terminal is receiving a call.

6.2 DMO Group Call

The user is able to initiate a DMO group call and participate as a listener of a DMO group call.

Up to 1024 DMO talkgroups can be programmed into the terminal, each of which has an associated DMO frequency. It is possible to map groups between DMO and TMO such that when moving from TMO to DMO or vice-versa the appropriate group is selected.

Calls initiated by the terminal will be to the selected group and only incoming calls to the selected group and the open group (DMO Inter-MNI calls), on the selected frequency, will be joined by the terminal.

Note: Talkgroup Scanning in DMO is not supported.

The terminal supports call initiation and acceptance of call change over, thus enabling the talking user (DMO master) to change within the DMO group call.

The terminals support talking party ID and when received from the transmitting terminal in an incoming group call transaction the ID will be displayed on receiving terminals.

A transmitting terminal will periodically send ‘late entry’ signals to enable other terminals to join the group call.

6.3 DMO Private Call

Private Call in DMO (a.n.a. Direct Mode Individual Call) allows the user to dial a selected TETRA terminal rather than currently selected talkgroup. Only MS to MS communication is supported. Repeater and Gateway are not supported. When a DMO Private Call takes place, terminals not involved in this call receive the channel busy indication.

Current implementation does not support the presence check. This implies that the calling party does not know if the called party is available when the call is originating.

The Terminals are identified by Short Subscriber Identities. DMO Private Call is a half-duplex call.

6.4 DMO Emergency

The terminal supports initiation and acceptance of DMO Emergency group calls, this includes support of call preemption. Emergency calls via gateway will also be supported. If Emergency Call is provisioned in the terminal, upon pressing the Emergency key/button in DMO, the terminal will go into Emergency Mode and allow the user to initiate an emergency call.

6.4.1 DMO Emergency Alarm

If the terminal is provisioned with the emergency alarm feature, upon entry into emergency mode, the terminal sends an emergency alarm. This alarm is sent by sending a specially designated SDS status message to the address of the selected group. The alarm status is received by all the radios attached to the same talkgroup.

6.5 DMO Inter-MNI Calls

Terminals support receipt of DMO group calls addressed to the ‘Open MNI’ (MNI and SSI all 1s), and those addressed to the Open Group (SSI is all 1s) with the home MNI or the MNI of the currently selected group.

Terminals can have a list of partnership DMO (Gateway) networks and if a call is received to the selected group and an MNI that is in the partnership list, a terminal will join the call if the selected group has been programmed to enable partnership.

The terminals also support call set up of a DMO group call to any provisioned GTSI and the MNI does not have to be in the partnership list.

6.6 DMO Gateway/Repeater

The terminal provides the capability of communicating in DMO mode with a TMO group via the Cleartone TETRA DMO gateway as defined in [Ref 24].

A DMO repeater re-transmits information received from one DM-MS to other DM-MS(s) over the DMO air interface.

The terminal allows the user to operate for each DMO talkgroup in one of 6 modes. The user can choose which mode to operate in:

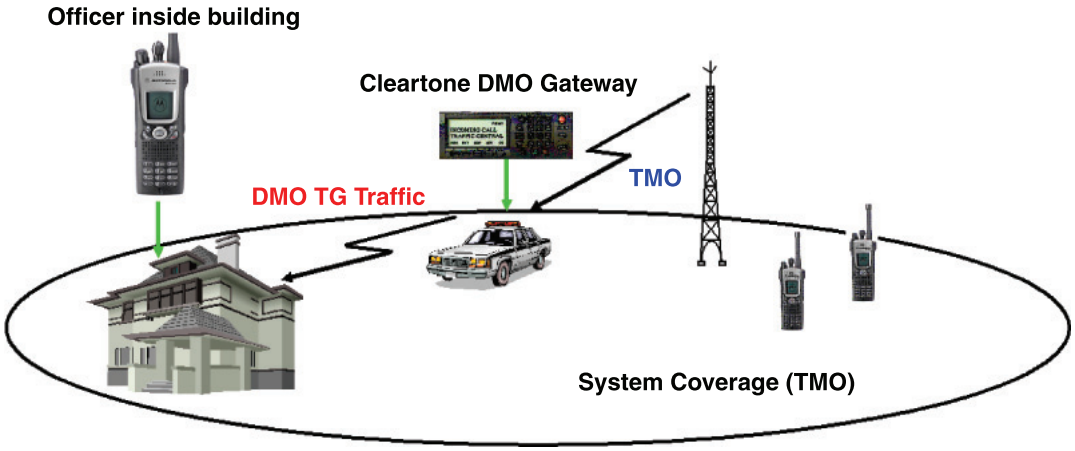
- **DM-MS to DM-MS only**: In this mode, the terminal will only initiate calls on this talkgroup directly - not via a gateway or repeater.
- **Specific gateway**: In this mode, the terminal can initiate calls on this group directly DM-MS to DM-MS or via a specific gateway address that is specified for this specific talkgroup. This gateway address will be editable by the user.
- **Automatic gateway**: In this mode, the terminal can initiate calls on the selected group directly with another terminal or via any usable gateway that is detected as present.
- **Repeater**: In this mode, the talkgroup should link to a repeater and by that to enhanced it's coverage area.
- **Specific gateway and repeater**: In this mode, the terminal will use only the gateway with the specified gateway address for that talkgroup and/or a DMO repeater.
- **Automatic gateway and repeater**: In this mode, the terminal will use the first available gateway for that talkgroup or a DMO repeater.

If either "specific gateway" or "automatic gateway" mode is chosen, and a suitable gateway is found, all outgoing calls will be made via the gateway. If a suitable gateway is not found, or a call setup via the gateway fails, the terminal will attempt to set up the call directly DM-MS to DM-MS.

If the terminal is idle (not involved in a call), it will follow incoming calls from either MS-MS or from a suitable gateway no matter which gateway mode is chosen.

When the user is operating on a gateway or repeater, the terminal indicates this to the user.

Here is a typical situation where a DMO Gateway enlarges the system coverage:



Benefits:

- ❏ Increases coverage of a communication system, allowing terminals to operate outside the normal TETRA system coverage.
- ❏ In building communication with the Talkgroup when the building is not in the coverage area of the TETRA system.

7 SDS - Short Data Services

Terminals support Short Data Service (SDS) status and SDS User Defined Data Types 1, 2, 3 and 4 as well as the old SDS-TL standard.

The terminal in DMO supports Short Data Service (SDS) status and SDS User Defined Data Type 4, both with and without SDS-TL.

7.1 Short Data Bearer Service

The terminal provides a short data bearer service for both internal and external applications.

7.1.1 Transport Layer Services

Terminal supports SDS Transport Layer services that provide end to end acknowledgments, delivery report requests, message numbering etc. for SDS User Defined Data Type 4 messages. The Transport Layer (TL) also provides SDS access for applications that do not request these services, but use a Protocol Identifier.

The terminal can be programmed to always send the delivery report by using SDSTL-Report, even if the originator requested a short report. It can also be programmed to support the old SDS-TL standard for operation on both Dimetra - P and other SwMIs.

7.1.2 External SDS Application Support

An externally device connected via the terminal‘s PEI interface may access the terminals SDS services, using the AT commands, to send and receive SDS status and SDS User Defined Data Types 1, 2, 3 and 4.

7.1.3 Downlink SDS Routing

Downlink SDS messages Type 4 are presumed to contain a Protocol Identifier in order to identify the target application, so if an external application has registered with the terminal for that PI, the terminal will deliver the message to the target application. If the terminal receives the same message with the same PI more than once due to successive retransmissions and it has already been acknowledged by the terminal it will neither store or re-send the messages to the target application.

7.2 SDS Addressing.

The terminal can accept SDS messages that are sent to any of the following addresses being used by the terminal:

- The terminal’s TETRA individual address (ISSI)
- Any group address (GSSI) that the terminal is monitoring
- The TETRA Broadcast address

A terminal user is able to send SDS messages to any TETRA address.

7.3 Status Messaging (Pre-defined)

7.3.1 Sending Status Messages (System Dependent)

The terminal is able to store up to 100 status messages, each of up to 12 alphanumeric digits, in the Status List.

Each entry in the list must have an associated unique number in the range 32768 to 61439. When a status message is selected by the user, it is the associated unique number that is transmitted and the called terminal looks up the received number in its status list and displays the message. The sender is notified of delivery status.

In TMO if no status ack or negative ack is received, the terminal will retry sending the message. The number of retries and amount of time to wait before retrying are provisioned parameters. The user will be notified regarding the delivery status.

As there is no ack for DMO status messages, the user will be notified only of sending the status message.

The status message can be sent between terminal and dispatcher or between terminals.

Benefits:

- ❏ Fast and reliable non-verbal communication with the dispatcher
- ❏ Provides access to all valid status values from the keypad
- ❏ Suitable for applications where each digit of a status has a specific meaning e.g. digit one: location, digit 2: importance...

7.3.2 Receiving Status Messages (System Dependent)

The terminal is capable of receiving status messages on any address that it is monitoring and during calls.

The user is alerted to the arrival of new messages and the terminal will display the mail message screen, allowing the user to instantly read the message. It is possible to store the message in the terminal's text message buffer.

7.3.3 PEI Access to Status Messaging.

The PEI enables external applications to send and receive status messages.

7.4 Text Message Service

Terminals support an internal text messaging application that uses the TETRA SDS Transport Layer.

The terminals are able to send and receive up to 140 bytes of data per text message, which can be up to 160 characters if 7-bit encoding is used, normally its 140 characters with 8 bit coding.

Benefits:

- ❏ Users can read, edit, create, store, delete and send text messages (140 characters) via the terminal keypad/display
- ❏ Receipt of message is acknowledged to ensure delivery
- ❏ "Consumed message" report indicates whether the message was read
- ❏ "Prompt" feature allows customized prompts for built-in database inquiries (e.g. "Enter social security number")
- ❏ Each prompt has a destination address, protocol identifier and editor associated for ease of use
- ❏ Predictive text editor (iTAP) ensures that only one button press is required per character input

7.4.1 Sending a Text Message

It is possible to compose or edit previously saved text messages prior to their transmission to a TETRA address. The message is sent with a request for a received delivery report.

7.4.2 Receiving a Text Message

On reception of a text message, the terminal places the text into a circular buffer, the user is notified of the new message and the message will be displayed in the mail message screen.

If a delivery report is requested, the terminal sends the report upon receipt of the message.

If a consumed report is requested, it will only be sent when the user reads the message. It is possible for the user to read the message when out of service (not in the system coverage area) and a report will not be sent.

7.4.3 Saving Text Messages

The user has the capability of saving received or composed/edited out going messages, these saved messages can be edited and sent as required and can only be erased by explicit user action.

7.4.4 Time Stamp

Each message is time stamped by the system and displayed on the receiving terminal.

7.4.5 Text Coding Scheme

The terminals support the ISO/IEC 8859 - 1 Latin 1 (8 bit) alphabet coding scheme for both Uplink and Downlink messages.

7.4.6 Dialing Numbers Received in Text Messages

A user is able to dial numbers from received text messages and if a message contains multiple numbers, they are then user selectable.

7.5 SDS Type 4 (Non Text Message)

7.5.1 Home Mode Display

This is a Dimetra IP proprietary Feature that enables configured ‘over the air’ text to be shown by default on a terminal’s display.

If this feature has been enabled, the terminal displays the text string to the user after the terminal has been idle (not in a call or receiving user inputs) for a several seconds

On reception of an SDS User Defined Type 4 message with a predefined Protocol Identifier (PI) for Home Mode Display, the terminal replaces the previous text with the new text received in the SDS message. This text will then be used until power down or until replaced. If an ‘empty’ text is received, the terminal will revert to its pre-programmed text.

The PI and message are programmed into the terminal’s code plug via CPS programming software.

7.5.2 ATS Entry Prompt (Predefined Templates)

This is a Dimetra IP proprietary feature that assists the terminal to send correctly formatted messages intended for computer applications.

The terminal user is able to select a predefined entry prompt that defines a message format to assist in the construction of the SDS message and it defines the areas that are read only and the areas that can be edited. Included in the definition is an entry field for the ‘send to’ address.

The message is sent via the SDS-TL with the PI and a received report request.

7.5.3 Remote Listening RL

This is a Motorola proprietary feature that uses specially encoded SDS messages that request a terminal to initiate a private call to a defined user and begin transmitting.

The terminals support this feature and will set up a private half duplex call to the defined TETRA address and begin transmission, the terminal will transmit any audio picked up by its microphone, the gain of which can be set higher for this operating mode.

This feature can be set up to operate in silent mode and users will not be aware of their involvement in the call.

This is similar to Ambience Listening.

7.5.4 Busy User Pre-emption BUP

Again this is a Motorola proprietary feature and uses specially encoded SDS messages that request a terminal, that is already involved in a private call, to clear the call so that it is ready to receive a high priority call.

The terminals support this feature and will wait on the main control channel (MCCH) for the message defined time period to await the call.

7.6 Terminal Features not Supported on Dimetra IP

These are terminal features that may be available on other systems, there is no commitment to support these requirements and there is no guarantee that they will be supported.

Note: Some of the features have limited testing only.

7.6.1 SDS - TL Short Form Report

The terminal can be programmed to send a ‘Short Form’ SDS - TL received report when the message originator enables Short Form Report. Short Form Reporting uses specially designated SDS status values instead of the SDS Report.

7.6.2 Text Message Addressing

In addition to supporting targeting messages to TETRA individual address, the terminal is also capable of sending messages to TETRA group and telephone addresses. The terminal does not display its own messages sent to its group Address.

7.6.3 Text Message Coding

In addition to the 8 bit coding scheme it also supports the 7 bit alphabet for GSM compatibility.

When sending a message to a PSTN number 7 bit encoding is always used and when sending a message to an ISSI or FSSN, 8 bit coding is used.

7.6.4 Service Center

The terminals support systems that employ store and forward service as indicated as part of the cell’s broadcast information.

If a Service Center address is programmed in the terminal, the terminal will support the store and forward operation.

The terminal will only notify users when messages are sent and not wait for the report from the Service Center, this is due to deficiencies in the air interface that do not account for the long life time of messages.

7.6.5 User Defined Data Types 1, 2 and 3.

Downlink SDS messages Types 1, 2 and 3 will always be routed to the PEI when an AT application is registered.

If no external application is registered, the message will be discarded.

Note: Type 1,2, and 3 user defined short messages are not supported by DMO SDS.

7.6.6 Sending SDS Status Messages

By default status messages will be sent to the address of the previous message if the user does not specify a new address.

7.6.7 Call Me Back Feature

This feature allows a user to page another terminal by sending a Call Me Back request. This request is implemented using a predefined status message

A certain time after initiating a private call to another terminal where the user has not answered, the calling terminal displays the Call Me Back request screen option to its user, who is then able to send the page.

Additionally a user is able to send a call back request to any terminal via menu functionality.

Call Me Back requests are received as normal status messages and like any other status message, the user is able to respond when viewing the message.

7.7 Store & Forward

This feature enables users to communicate with each other without being available at the same time. If the destination is not online, the message will be stored until it is available or the expiration time was exceeded.

7.7.1 Addressing of Store and Forward Message

User is able to send the Store and Forward message to an individual address. If the user chooses to send it to the group, the message status is swithced from Store and Forward to Immediate.

7.7.2 Outbox

Only Store & Forward messages are stored in Outbox. Seven options are given to the user that are described below:

- Store - to save the message as a template.
- Delete - to remove the message from the list.
- Delete All - to remove all the messages from the list.
- Resend - to send it again to the same recipients with the option to edit the text.
- Forward - to send it to the other person with the option to edit the text
- Refresh - to re-order the messages list and see the newest at the top
- Status Msg - to check the time and the date of Msg Sent, Msg Delivered, Msg Read, Msg Expired or was not delivered. Everytime there is a status change the user is going to receive a new message regarding it.

Delivery report is saved in Inbox and in the associated message in Outbox. However it is deleted from Inbox after viewing it.

7.7.3 Outbox Capacity

Outbox is able to store 100 short messages at one time or up to 20 long message.

When the user enters Message submenu, the number on the right side of Inbox and Outbox is indicating how many message are in.

If the Outbox is empty, the radio will display “No Messages” notification.

7.8 Concatenation

This feature enables users to send a long text message up to 1000 characters. All the messages that are longer then 140 characters are going to be divided and sent separately one after another. When the user receives all the parts of the message it will be displayed as one on the screen.

7.8.1 Buffer Full, Overwrite Policy

When the radio receives SDS message and the Inbox/Outbox is full it will act according to the settings in the CPS. Please see Chapter 3, Paragraph 29.4.10 "Buffer Full, Overwrite Policy" for more information.

7.8.2 Timestamp for Received Text and Status Message

When the text or status message is received and accepted, the radio retrieves actual time information from its internal clock.

7.8.3 Process of Receiving Long Text Message

Radio is able to reconstruct a Long Text Message consisting of up to 10 short messages. The maximum length of the message is 141-1000 and it can be defined in the CPS. It recombines the text segments independently of the order they have been received to the correct order of the original message. The message can be combined only if all the Message Reference Number are correct and Segmented Receiver Timer is still valid.

7.8.4 Addressing of Long Text Message

User is able to send the Long Text Message to Group and Individual destination.

7.8.5 SDS Interacitons

- DMO Mode - this feature is not supported.
- Receiving the Message during Group/Broadcast Call - radio allows receipt of the text message during ongoing group call and broadcast call. Group/Broadcast call is displayed with the “new mail arrived’ icon and tone ‘Mail Rcdv’ is played.
- Emergency Mode - user is not able to receive and send SDS messages.

8 Packet Data (TMO)

In TMO the terminals provide a TETRA bearer service for applications that use the IP protocol. External applications are able to use this service by connecting via the PEI interface.

External applications will be able to use this service by connecting via the PEI interface, as described in Paragraph 13 "PEI Characteristics".

8.1 General

The terminal supports TETRA standard multi slot packet data using the IP network layer protocol.

Packet data applications will reside internally, over UDP, or in an external device connected to the 8 wire RS232 data port on the terminal. Communication to the external device is initialized using AT commands and once connected the external device may request PPP mode and will then operate in PPP mode until the data connection is terminated.

8.2 Connectivity

The system provides point to point IP connectivity allowing the following datagram exchanges:

- Terminal <-> External Equipment (TE2) - PC etc.
- External Equipment (TE2) <-> Network (via Terminal)

8.3 Packet Data Terminal Interface

The terminal:

- Supports only IP version 4 packets
- Routes datagrams independent of the protocol sitting on top of IP
- Supports an MTU of 1500 bytes
- Provides a best effort delivery service, but if delivery fails, the originating user application will be informed, if possible, by sending back to TE2 an ICMP message

8.4 Voice + Data Support

The terminals are able to alternate between voice and the packet data service, but do not support simultaneous voice and packet data transmissions.

8.4.1 Voice Only Mode

This is a user menu selectable option that is remembered at power up and if selected, packet data functionality is disabled. If the packet data service is active when voice mode is selected, then the packet data service will be disabled and the PEI will operate in local mode only. This will allow TNP1 operation which does not require PDP context activation.

8.4.2 Data Only Mode

This is a user menu selectable option that is remembered at power up and if selected, normal voice calls are not permitted and all non emergency calls will be rejected.

Both set up and reception of emergency calls is still permitted.

8.4.3 Voice Priority Mode

If any voice call activity occurs during a data session, it will have priority over packet data. The packet data session will be suspended until voice call completion, after which the packet data session will be resumed.

Voice priority is the default mode if the user has never explicitly selected an interaction mode.

8.5 Packet Data MMI Operation

The terminal shows an indication to the user whenever the PDP context is active and it shows the amount of used slots. The terminal has a separate indication to the user to indicate when data transfer is in progress.

8.6 Priority of Packet Data

The packet data service access signalling for a packet data channel (PDCH) have the same priority as that for normal call set up.

8.7 Terminal Generated ICMP Messages

In the case of non delivery due to the terminal's environment, the terminal will generate ICMP messages and address them to the TE2. The available messages include:

- No radio coverage
- Failed transmission
- Service interaction

8.8 IP Addressing

8.8.1 Wide IP Address

An IP address may be assigned to the MS by the system when the terminal registers for data mode operation. When assigned, the address is used by both the terminal and the connected external application as the source address in the IP packets delivered to the infrastructure and received as the destination address from the infrastructure.

8.8.2 Local IP Address

By default both TE and MT have their own IP addresses: "10.0.0.100" and "10.0.0.101" respectively as specified in [Ref 4] clause 4.10.2. These addresses are used by TE2 and MT2 for local datagram transmissions between TE2 and MT2 only and are not passed to the SwMI.

8.9 Advanced Link

Dimetra IP does not support Advanced Link Flow Control, but Advanced Link Flow Control is supported by the terminals.

The MS will discard received packets when its buffer is full and the system is expected to retransmit these discarded packets.

Advanced Link Roaming, when the Advanced Link is not disconnected between cells, is supported by the terminal.

8.10 IP Compression

The terminals do not support data compression and if an application attempts to negotiate data compression during connection to the terminal and set up, it will be rejected. If a compressed data IP packet is received from the system it will be 'silently' discarded.

The terminal does support IP header compression negotiation by an application during connection to the terminal and set up and will transparently transfer IP packets with header compression between the application and system.

8.11 Roaming of Terminals

The packet data service employs the TETRA standard cell selection and re-selection, i.e. “undeclared” both when the terminal is not involved in packet data transfers and when the terminal is on the PDCH. The packet data service is suspended (in “break” state) while the reselection is occurring, and resumes when the cell reelection procedure is complete.

Note: The cell re-selection is “undeclared” in a strict TETRA sense. However, the SNDCP protocol defines a procedure for reconnecting the packet data service on the new cell. In this sense, the cell re-selection procedure resembles the “unannounced” cell re-selection procedure.

8.12 PD User Authentication

PD User authentication is a method of authenticating the TE2 user before allowing activation of the packet data link. The actual authentication is preformed by an authentication center connected to the SwMI. The terminal only relays the messages between the TE2 and the SwMI.

In “wide mode”, the terminal will offer PPP user authentication between MT2 and TE2 using PAP or CHAP (as described in [Ref 22]) before the IP link is established. The terminal will always attempt to negotiate usage of the CHAP method, but will agree to PAP if the TE2 application insists. If the terminal is provisioned to not require PD user authentication, it will operate without any user authentication if the TE2 application refuses to accept CHAP or PAP. However, if the terminal is provisioned to require PD user authentication, it will reject the PDP context activation.

Note: If the SwMI does not agree to the authentication method (e.g.: PAP), the SwMI can reject it.

8.13 Voice + Data Service and Feature Interaction

8.13.1 Voice Service Interaction

During voice priority mode, a voice service will cause the terminal to move to a traffic channel. The MS will terminate all active packet data transmission and reception and suspend the packet data service. The packet data service will be resumed on the completion of the voice service.

8.13.2 SDS Interaction

A terminal will accept any downlink SDS message received on the PDCH.

A terminal is capable of sending uplink SDS messages on the PDCH.

9 Mobility Services

9.1 Main Control Channel Frequencies

The terminal is capable of finding a wide range of main control channels and this is done by maintaining 4 different lists that are scanned in order.

- **List 1**. This is a dynamic list of up to 32 discrete frequencies that is maintained by the terminal.

- **List 2**. This is a static list of up to 32 discrete frequencies specified by the system operator and entered during terminal programming via the CPS.
- **Lists 3**. A frequency range specification, using a specific offset, that can be preprogrammed in the factory. The system operator can modify this range via the programming tool. The terminal will scan all frequencies in 25kHz intervals in the specified range.
- **Lists 4**. An additional frequency range specification as above. Having 2 separate range specifications allows for 2 non-contiguous blocks of frequencies or 2 different offsets.

9.2 Multi-System Operation

9.2.1 List of Allowed Networks

A terminal can hold a list of up to 32 ‘allowed’ network identities (MMCC/MNC) and registration on any of these networks is performed using the terminal’s ISSI without migration signalling. The same ISSI must be used on all networks.

The first entry of the network list must be the terminal’s Home Network and each entry can have an associated name for identification purposes.

The terminal user has menu option functionality to limit the terminal’s registration to the Home Network only, or to a selected network only and in either case the terminal will ignore the other ‘allowed’ networks.

9.2.2 Home Only Mode

If this option is selected, the terminal will only use the first entry in the list of allowed networks. All other allowed networks if found first during power up, or during cell reselection will be ignored even if they offer stronger or better signalling conditions.

9.2.3 Selected Network Mode

If this option is enabled, the user selects the required operational network from the allowed list of networks. The terminal will then only register and operate on this network. All other allowed networks if found first during power up, or during cell reselection will be ignored even if they offer stronger or better signalling conditions.

9.2.4 Switching Between Network Modes

Using the menu feature, the user is able to switch between the following network modes:

- Home Only
- Selected Network - when selected, the terminal displays the list of allowed networks for user selection.

9.2.5 Services

The terminal will operate on all networks as it does on its home network, all calls will be made using SSI addressing and it is the systems responsibility to reject calls to subscribers or groups that cannot be reached.

Note: It is assumed that telephone numbers with the local country code will be understood by the telephone gateway and dialed to the local number as a local with the country code deleted and any front digit re-inserted as required. I.e. +44-1256-358-211, in the UK this will be amended to 01256-358-211 and dialed.

9.2.6 MMI Operation

The user can change the network mode via the menu system. A top level menu item called ‘Net Select’ is provided which when selected will give the user a choice between “Home Only” or “Selected Network”. When the user chooses a new mode, if initial cell selection is needed (as described above in 9.2.4) the terminal will leave the current cell and begin scanning from the beginning of its frequency lists.

In the selected network option, the user is shown a list of network names where each network name corresponds to one of the MNIs in the list. The network names are provisioned in the terminal as part of provisioning of the MNI list.

The network alias or MNI of the current network is displayed on the first line of the idle display.

9.3 Registration

Note: Security aspects of registration is covered in Paragraph 11 "Security Services".

Upon camping on a cell, the terminal will send a registration request PDU to the SwMI, which includes a request to attach to the terminal’s selected group. If the registration and attachment succeeded, the terminal will begin normal operation on the cell.

If the registration attempt times out, or the registration is rejected by the SwMI for a temporary reason, another registration attempt should be made. If this fails as well, the terminal will attempt to camp on a different cell.

If the registration is rejected by the SwMI with a rejection cause that indicates that the terminal cannot operate in this system, and there are other systems in the terminals MNI list, the terminal will attempt to find a cell that has a different MNI than the rejected system.

If the registration request is denied by the SwMI due to Location Area Rejection, the terminal will not attempt to register again at that cell until the next power on.

The terminal supports the modification of its subscriber class upon receipt of a new subscriber class from the SwMI in the registration acknowledgement PDU. This subscriber class will be used until power down or next ITSI attach, it is not saved in non-volatile memory.

9.4 Roaming

The terminal will continually monitor neighbour cells and will background scan the highest ranked neighbour cell. When the state of the highest ranked neighbour cell is sufficiently better than the serving cell, or when the terminal has totally lost the serving cell, the terminal will employ cell reselection procedures employing the following methods as described in [Ref 1] clause 18.3.4.7.1

1. If not in a call:
   - Undeclared Cell reselection
2. If in a call and not transmitting or link failure occurs:
   - Unannounced Cell-reselection
3. If transmitting in a call, and a neighbor has been scanned, and the cells are synchronized:
   - Announced Type-2 cell reselection
4. If transmitting in a call and no neighbor has been scanned or the cells are not synchronized:
   - Announced Type-3 cell reselection

For compatibility with systems that do not support U-PREPARE containing a cell ID parameter, the terminal can be provisioned to never perform Type 2 cell reselection.

The terminal will decide the need for cell reselection, based on comparison of the signal strength and the service level between the serving cell and neighbour cells. The service level criteria shall be based on the following criteria which are listed in priority order:

- System Wide Services available (Local/Wide Trunking)
- Security Class
- Subscriber Class
- Location Area (Home Location area)
- Cell Load

The terminal will always prefer a cell that has a higher service level to one with a lower service level. If the terminal is operating on a serving cell that has a lower service level than a neighbour cell, the terminal will roam to the neighbour, even during a call.

9.5 Subscriber Class

When the terminal registers on a cell that does not support any of its subscriber classes, it will only participate in services that have emergency priority.

9.6 Local Site Trunking (LST)

This that allows a base station to operate as stand alone when the link to the zone controller has gone down. The terminal will limit functionality when the cell is in this mode.

If system wide broadcasts indicate that system wide services are not available (LST) on a cell, a terminal will only register on the cell if there are no system wide cells available.

When the terminal is operating in LST it goes into DMO and will prevent the user from invoking the following services:

- Private Call
- Phone Call
- PABX Call
- Packet Data

Whilst operating in LST, the terminal is always searching for a cell with system wide capability and will switch to such a cell as soon as possible.

10 TETRA Network Protocol 1 (TMO)

TETRA Network Protocol type 1 (TNP1) is a bridge protocol based on the TETRA layer 3 over the air protocol and is therefore capable of supporting all TETRA dispatch functionality.

In TMO the TNP1 specifies a protocol to be used over the PEI that allows Terminal Equipment (TE2) to have control over the TETRA services: mobility management, call control, short data service and supplementary services. In addition there are commands to access the radio configuration and storage parameters.

10.1 General

The terminal supports TETRA standard multi slot packet data using the IP network layer protocol.

Packet data applications will reside internally, over UDP, or in an external device connected to the 8 wire RS232 data port on the terminal. Communication to the external device is initialized using AT commands.

10.2 Connectivity

The system provides point to point IP connectivity allowing the following datagram exchanges:

- Terminal <-> External Equipment (TE2) - PC etc.
- External Equipment (TE2) <-> Network (via Terminal)

The terminal supports IP version 4 and IP version 6 packets.

TNP1 services can use one of two PPP methods to connect from the TE to the MT, local mode, and wide mode. TNP1 should be used in wide-mode wherever possible, so as to allow the parallel operation of TNP1-SDS services and Packet date services over a common PPP link.

10.2.1 IP Addressing

10.2.1.1 Wide Mode

In this mode, all TNP1 services are available including packet data transfer towards the SwMI. The address used is the dynamic address MS IP.

10.2.1.2 Local Mode

In this mode, all TNP1 services are available except packet data transfer. The address used are the two static addresses TE IP: “10.0.0.100” and MT IP: “10.0.0.101”.

10.2.2 Port Addressing

The terminal uses a fixed port address for reception and transmission of TNP1 packets. The port number is 4024.

10.3 Service and Feature Interactions

10.3.1 TXI Mode

TNP1 is available in local mode when TXI is enabled although all SDS messages will be blocked. The terminal will drop the wide mode connection if TXI is entered, thus the PEI would go back to AT mode. It is then up to the TNP1 client to detect this and reinitiate the PPP session in local mode (This is the choice of the TNP1 client).

10.3.2 DMO Mode

The terminal disables the TNP1 session while in DMO.

10.3.3 SDS and Packet Data

TNP1 implementation allows SDS and Packet Data transmission simultaneously.

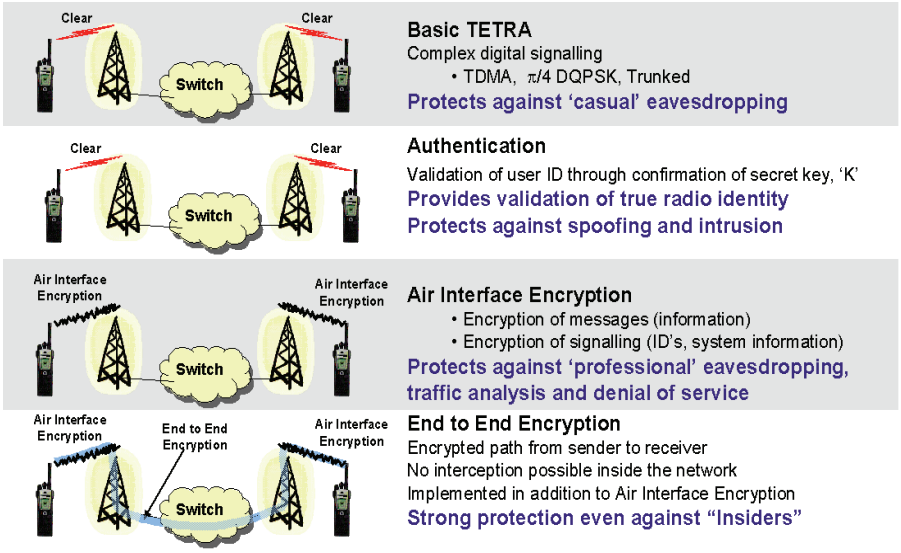
10.3.4 AT commands

AT commands are used to initiate the PPP service in order for TNP1 to operate. Once the PPP session is running all AT commands are blocked. When the PPP session is closed then AT commands are available to the programmer.

11 Security Services

The terminals are able to provide TETRA security features as required in TMO.

TETRA provides the following 4 Levels of Protection:



11.1 Terminal Equipment Identifier (TEI)

This is a unique identity programmed into the terminal at the factory and cannot be subsequently modified. It is write on the terminal's label and can be displayed in the CPS after reading the terminal. The Terminal Equipment Identifier TEI will be used for the Authentication and Encryption features.

Benefits:

- ❏ As TEI is unique for each terminal and is not editable, it prevents duplication of terminals in the system.

11.2 User Authentication

Background:
Authentication is used to prevent an attacker with an unauthorized terminal communicating with an official infrastructure.
Also to prevent an attacker with a fake infrastructure communicating with an official terminal.

Functionality:
When authentication is used the infrastructure as well as the terminals have to contain an electronic key string (K) that is provisioned 'In Country' and consists of 12,000,000,000,000,000,000,000,000 possible key combinations.

When the terminal registers on a system both the TEI and the Key are sent to the system, this is then followed by the terminal's ISSI and the Key. The system will then do a cross check on the received information with that held in its security centre and if the information is correct it will allow registry.

Each time the terminal starts a session it will also use a new over the air encryption key and because of this, it is not possible to work backwards to discover the terminal's electronic key. If terminals are returned for repair their key have to be removed and to replaced with a new key after repair.

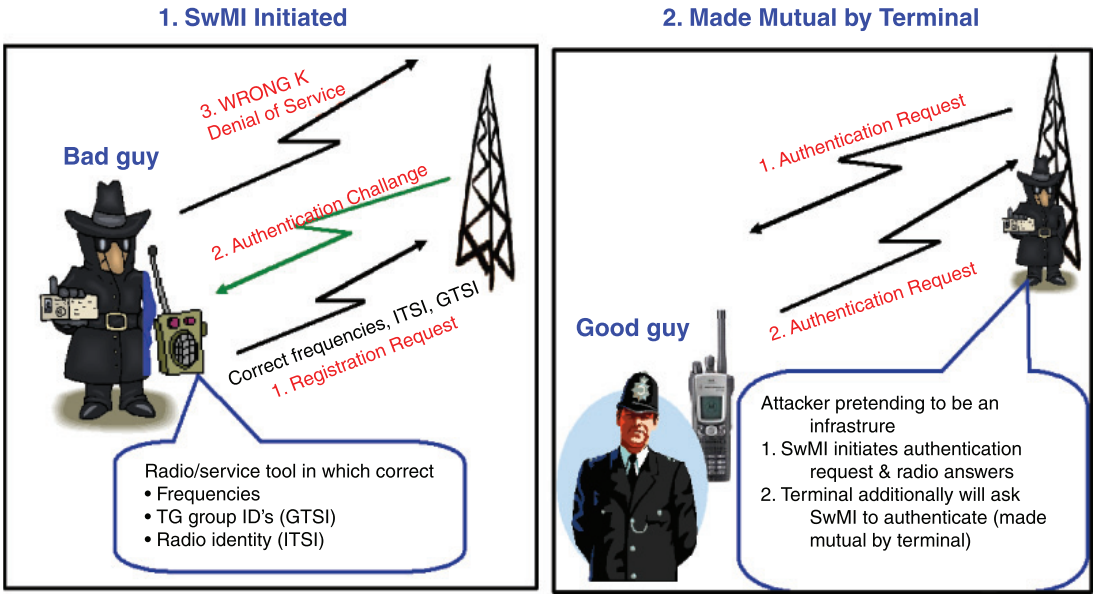
The 'In Country' Key is replaced on a regular basis.

The terminal supports system initiated user authentication, but not terminal initiated authentication of the system.

If the terminal is programmed for Mutual Authentication, then whenever the terminal is authenticated by the system, it will authenticate the system.

Feature description – 2 types of Authentication:

1. 1. Authentication ensures that the official infrastructure "validates" a terminal (initiated by System).
2. 2. Terminals "validate" the infrastructure after an authentication request (initiated by System made mutual by Terminal) before any voice / data communications can take place.



Agenda to the picture above:

- ITSI: Individual TETRA Subscriber Identity
- K: Authentication key – unique for each terminal unit
- GTSI: Group TETRA Subscriber Identity

Benefits:

- ❏ Major enhancement of overall system security & integrity
- ❏ Prevents eavesdropping / ensures airtime is not stolen
- ❏ Allows user safety in the knowledge that only authorized users are using the network
- ❏ Prove that an MS is not a Different Terminal, not a “Clone” or not a “Hacker”

11.3 Air Interface Encryption (AIE)

The terminals support TETRA Air Interface Encryption AIE using the standard TETRA Public Encryption algorithms - TEA1, TEA2 and TEA3 in AsiaPac.

The Focus of Cryptography in TETRA is the Encryption Key:

TETRA AIE provides 12,000,000,000,000,000,000,000,000 key combinations

Benefits:

- ❑ Which will take a long time and cost a lot of money to attack, even with tomorrows computer power!

TETRA has 3 Classes of Encryption:

- Class 1 - Clear (None)
- Class 2 - Static Key Encryption
- Class 3 - Derived Key Encryption (sometimes called Dynamic key), Common Cipher Key and Group Cipher Key

In Direct Mode only the Static Cipher Key (SCK) type is defined.

11.3.1 Clear Terminals (Class 1)

A terminal can be configured as a “clear” terminal, in which case it will identify itself in registration as a “Security Class 1” terminal and not support encryption. A Security Class 1 terminal will not contain any encryption algorithms in its software.

11.3.2 Static Cipher Key SCK (Class 2)

The terminals support static air interface encryption and authorized terminals share up to 32 static cipher keys (SCK) with the system.

The terminal determines which static cipher key to use based on the SCK Number (SCKN) and the SCK version number (SCK_VN) broadcast by the system on the control channel.

Terminals can be either ‘Clear’ or ‘Encrypted’ and a Clear terminal will identify itself to the system during registry as a Class 1 terminal. An encrypted terminal identifies itself as a Class 2 terminal during registry.

In Direct Mode the SCK can be chosen by the system manager and may be distributed from the TMO SwMI using the OTAR mechanism or it can be entered manually.

11.3.3 Derived Cipher Key Encryption DCK, Common Cipher Keys CCK and Group Cipher Keys GCK (Class 3)

Background:

DCK/CCK/GCK required to prevent over-exposure of key material.

Existing encryption systems use Static Cipher Keys (SCK), one key is used for all terminals and all calls:

Key material is often exposed

SCK logistics of changing keys = reprogram all terminals & Base Stations

Feature description:

DCK is used for both uplink and downlink for private calls

DCK/CCK/GCK encryption provides DCK (Derived Cipher Key) for “uplink” (from terminal to EBTS) communication and CCK (Common Cipher Key) or GCK (Group Cipher Key) for “downlink” (from EBTS to terminals) group communication

Functionality:

The terminals supporting Dynamic Key Encryption identify themselves to the system as Class 3 terminals during registry and attempt to negotiate Class 3 encryption.

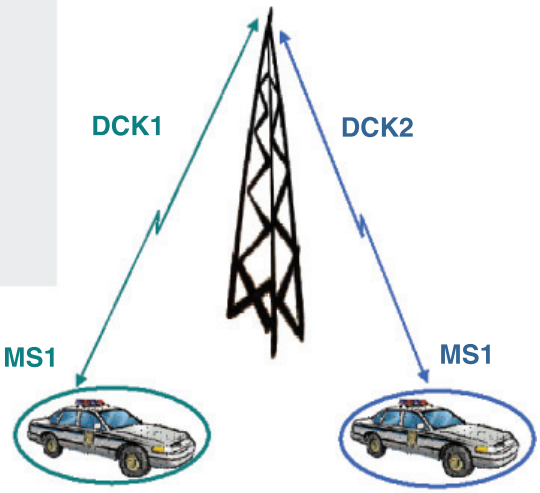
A Class 3 terminal supports group addressed signalling and group call traffic encryption using Common Cipher Keys (CCK) as well as encryption of uplink and down link individually addressed signalling messages and individual call traffic (private or phone) using its derived cipher key (DCK). Additionally Class 3 supports dedicated group addressed signalling and dedicated group call traffic encryption using Group Cipher Keys (GCK) to cryptographically isolate talk groups.
The DCK is derived from either the one way or mutual authentication process and the CCK is received during registry. GCK is received through OTAR mechanism only.

The terminals support ‘Over the Air Rekeying’ (OTAR) of the CCK and GCK by the system.

A ‘Clear’ terminal is able set up calls to and receive calls from encrypted terminals. The system informs the encrypted terminals that the call is with a Clear Terminal and they switch to clear operation. Class 2 & 3 terminals can only do this if they are allowed to operate in a lower class.

DCK: Derived Cipher Key:

- Different for each user
- Protects:
  - Individual Call Payload (Voice & Data)
  - Signalling
- New Key at each Authentication (Logon)
- Key based upon a secret (K) known only to Individual MS and System
- Key never sent “over the air”

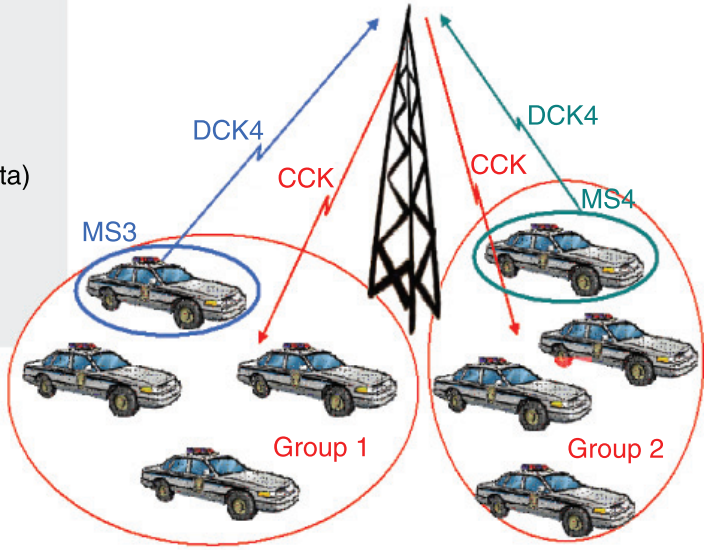


Individual Calls

Class 3 DCK: Strong Individual Protection for Each User

Individual DCK cannot be used for Group Calls (only known to individual)

CCK: Common Cipher Key
- Known to all Group Members
- Delivered to MS immediately after Authentication (Logon)
- Protects:
  - Group Call Payload (Voice & Data)
  - Identities
- Changed “Daily”



Class 3 CCK:
Strong Protection for Groups

Benefits:

- ❏ Increased security, better protection of sensitive voice, data, identities and signalling information.
- ❏ Regularly changing the keys makes the TETRA services more difficult to crack by potential attackers.
- ❏ DCK is a new Key at each Authentication (Logon), and is never send “over air”.
- ❏ CCK is known to all Group members, and is changed daily.
- ❏ GCK is known to dedicated Group members, and is changed every 3 months by default daily.

11.3.4 Encryption Mobility

A Class 2 or Class 3 terminal will also be able to operate on a lower class SwMI if it is provisioned to allow this. A terminal that is provisioned to not allow operation on a lower class SwMI, will not register on such a cell.

A Class 2 or Class 3 terminal upon camping on a cell that supports an SCK/CCK/GCK that the terminal possesses, will apply AI Encryption to the registration PDU. If no acknowledgement is received, the terminal will then send the registration in clear.

11.3.5 Encryption MMI

A Class 2 or Class 3 terminal that is involved in a clear call, will provide a visual as well as an audible indication to the user that the call is not encrypted.

11.3.6 AIE Key Storage

The terminal stores the SCK and Kall the keys, SCK/CCK/DCK/GCK, in a sealed manner in non-volatile memory of the terminal - but not in the codeplug.

The terminal supports loading of the keys via a Key Variable Loader (KVL) tool.

By using a special secret key combination it is possible for a user to delete the cipher keys in the terminal. This can be provisioned to erase either all keys or only the long-term keys.

11.3.7 User Key Deletion

User can delete Encryption & / or Authentication keys by a special sequence from the keypad.

Benefits:

- ❏ This allows user to clear the keys e.g. for transit.

11.3.8 Interaction Network/Terminal - Encrypted/Clear

Radio vs. Network	Clear Mode (i.e. radio loaded with Clear SW) Encrypted Only Flag: not set (only applies to MR3.0)	Encrypted mode (i.e. radio loaded with TEA2 SW) Encrypted Only Flag: not set (only applies to MR3.0)	Clear Mode (i.e. radio loaded with Clear SW) Encrypted Only Flag: set (only applies to MR3.0)	Encrypted mode (i.e. radio loaded with TEA2 SW) Encrypted Only Flag: set (only applies to MR3.0)
Constant Clear Mode	MR2.1 & MR3.0 : when registering, radio will detect system is in Clear mode and will register in Clear mode. All calls and operation possible.	MR2.1 : when registering, terminal detects system is in Clear mode and thus will register in Clear mode. Radio will operate normally within the cell which registration took place but will drop out of service during handover. Radio will typically display No Group. Recovery is only achieved by turning radio On/Off. MR3.0 : when registering, radio will detect system is in Clear mode and will register in Clear mode. All calls and operation possible.	Invalid Scenario. If the MR3.0 Encrypted Only flag is set then the terminal CANNOT enter Clear mode in any circumstance. Thus, the radio is always in Encrypted mode - which is not possible with Clear software - refer to the comments in the next column	MR3.0 - the radio will detect from the system broadcast that Encrypted Mode is not supported and thus cannot register. Radio Display : tbc
Constant Encrypted mode	MR2.1 and MR3.0 : Radio will not be able to register on system as it only has Clear software. Radio will display Registration Failure	MR2.1 and MR3.0 : Radio works normally		MR3.0 Radio will register as normal - full operation
Switch from clear to Encryted	MR2.1 and MR3.0 : Radio will not be able to register (as Encrypted) on system as it only has Clear software. Radio will display Registration Failure	MR2,1 : radio will succesfully move to Encrypted mode if it is still in operation in Clear mode. If however the radio has failed handover etc, the radio is "locked out" and will need to be reset to regain operation on the encrypted network MR3,0 : will succesfully switch to encrypted mode after detection of the secure network broadcast info.		MR3.0 Radio will register as normal when switched to encryption - full operation
Switch from Encryted to clear	MR2.1 and MR3.0 : invalid scenario since the radios only have Clear software - they will never be in encrypted mode. If however this scenario did occur, typically the radios would have been in "Registration Failure" so once system has moved to Clear, terminals could be reset and they would succesfully register in Clear mode.	MR2.1 and MR3.0 : Radio switches to clear after detection of updated system broadcast. MR2.1 : same situation exists as in "Constant Clear mode" in that once registered, terminal will fail during handover to other cells.		MR3.0 - Will begin in encrypted mode, operating correctly. When the radio detects from the system broadcast that Encrypted Mode is not supported, the radio will display "Registration Failure" and thus cannot operate.

11.4 End-to-End Encryption

The TETRA standard supports encryption over the air. Air Interface Security is defined and specified for TMO and for DMO, see Paragraph 11.3 "Air Interface Encryption (AIE)". The terminal creates the PDU (Packet Data Unit) and the PDU is encrypted before transmission. The base station receives this PDU and needs to decrypt it, to know what to do with it and where to send it. Thus, if a PDU contains voice information, the voice part of the message has been decrypted and is now unprotected, until it is transmitted out to the caller.

The End-to-End Encryption feature (E2E encryption) resolves this by encrypting the voice information before it is packed into the PDU. The voice encryption is carried out by a Universal Crypto Module (UCM), which takes the voice stream and encrypts this stream using a set of keys. Likewise, the UCM takes encrypted voice stream and using the same keys decrypts back into clear voice.

You are capable to make or receive E2E encrypted calls:

- TMO Group Call (selected group, scanned group, announcement group, console patch groups - if the console is capable to patch groups, priority monitor and emergency group call)
- DMO Group Call (direct, via DMO gateway, via DMO repeater)
- Private Call (half-duplex, full-duplex)

Note: Phone Calls and PABX Calls will be always clear and E2E related alert tones will not be play.

11.4.1 E2E Key Storage

The terminal stores the E2E keys:

Key encryption key (KEK) - This is the encryption key used to seal other encryption keys for secure storage or transmission.

Traffic encryption key (TEK) - This is the encryption key used for the EtE.

The terminal supports loading of the encryption keys via the KVL/KMF solution.

11.5 Terminal Disable/Enable

Terminal disable is possible using TETRA Temporary Disable. The Dimetra IP system disables and re-enables the terminal's 'subscription' (ITSI) and this is supported by the terminal.

Upon receipt of a D-DISABLE with 'Subscription Disable', the correct SSI and MNI of the MS, the terminal will be disabled and the terminal will remember this during power down.

Whilst disabled, the terminal continues to perform Mobility Management functions to facilitate subsequent enabling of the terminal.

The terminal must receive the D - Enable message with its SSI and MNI before being restored to normal service.

Benefits:

- ❏ Immediate disabling of the subscriber by the dispatcher via the air interface if the terminal is compromised/stolen.
- ❏ Reversible, the terminal can be enabled again once found.

Note: If the encryption keys are erased, the MS puts itself in the disabled state. Permanent Disable is not supported

11.6 Terminal Permanent Disable

Permanent disabling is intended to protect a network from attack from a compromised or faulty MS. It can be used when the MS is known to have been compromised, or has been suspected of compromise for a long time.

It is a one way function, there is no equivalent enable. The MS would need to be recovered and reprogrammed before it could be used again.

When the MS is permanently disabled, it becomes inoperable:

- ❏ All its security key material, that is GCK, GSKO, DMO SCKs, Ks, DCK, CCK, TMO SCKs and End-to-End key material are deleted.
- ❏ All its Codeplug is deleted.
- ❏ All its Software is deleted.
- ❏ All its MMI interfaces on the MS are disabled.

The Permanent Disable is recommended to be invoked when it has been determined that a MS is absolutely unrecoverable. When a MS has been lost or stolen, the first step always is to stun (Temporary Disable) the MS, followed by a disabling of the user in the Radio User Record of the UCM.

Permanent Disable is recommended to be used in conjunction with the deletion of the user's Radio Record in the UCS and the deletion of the K-Ref association of the disabled MS in the PrC and the AuC that lies within the cluster where the MS's home zone is located. This ensures that subscriber information is not downloaded into the HLR if a restore of the UCS is performed.

The system operator has to also ensure that the MS's K-Ref association is also removed from the other AuCs in the network, in cases where the K-Ref pairs are duplicated across the network. Note that if this is not performed, the MS could be assigned a new home zone that lies in a cluster where the K-Ref association has not been deleted.

Benefits:

- ❏ Immediate and complete disabling of the subscriber by the dispatcher via the air interface if the terminal is not expected to be recovered.

11.7 PIN & PUK Numbers

The terminal is capable of requiring a Personal Identification Number (PIN) for authentication from the user before it performs any network operation. The PIN is a 4-digit number.

The terminal user can use the menu functionality to enable or disable PIN lock, and to change the PIN code. However, the user is not able to disable PIN lock or change the PIN code when the terminal is PIN locked.

The ability to enter a PIN will be blocked after a number of unsuccessful attempts to enter the PIN. The blocking can be released only by using an 8-digit PIN Unblocking Key (PUK). The terminal will require the user to define a new PIN once the PUK has been successfully entered. The number of maximum unsuccessful PIN attempts can be programmed via CPS programming (default is 3).

The PIN and PUK are stored in the code plug. There is also a parameter that indicates if the PIN is enabled or disabled and if it is enabled, the user must enter the PIN on power up.

Benefits:

- ❏ 4 digit PIN code required to access terminal (if PIN is enabled) provides an extra level of security
- ❏ After 3 failed attempts the PUK code is required (programmable)

11.8 High Assurance Boot (HAB)

The terminal has a facility that ensures that the code and data flashed in the terminal is authentic and has not been altered. The HAB module is forced by hardware to run at boot time and check that all software comes from a trusted source by checking the signature of the code and data segments present in the terminal using a public/private key mechanism. The keys are downloaded using the provisioning tool.

If HAB authentication of the flashed software fails, it will not allow the terminal software to run.

11.9 Terminal Disable/Enable on Non-Dimetra Infrastructures

In addition to 'subscription disable', some Non-Dimetra Infrastructures can disable the terminal (TEI) and it can disable either the 'subscription', or 'equipment' or both.

Upon receipt of a D-DISABLE with 'Equipment Disable' with the correct TEI, the terminal will be disabled.

If the terminal is in the equipment disabled state and receives a D-Enable with the correct TEI (in the case of equipment disable), the terminal will be restored to its normal operative state (provided that the subscription is also in the enabled state).

11.10 Tamper Protection Labels

This a special label which needs to be ordered with the terminal optionally. It automatically destroyed if attempted to open up the terminal.

Benefits:

- Any attempt of manipulating the terminal or reading the key inside the terminal is obvious and visible

12 Numbering and Addressing

Each terminal has an Individual TETRA Subscriber Identity ITSI which is used for addressing it over the air interface and as these number can be long and it is time consuming to enter such a number when dialing, a number of short number dialing schemes can be used to limit the SSI digit entry.

12.1 Short Addressing Schemes

Alternatively, the terminal can be programmed to treat a short number as an Short Subscriber Identity SSI. This scheme can be refined to allow short dialing within a fleet by combining the ID entered with the terminal's own SSI.

12.1.1 Short Number Dialing Using ISSI

If the terminal has been programmed to treat a short number as a TETRA Short Subscriber Identity, and the number entered is less than 7 digits, the terminal's own identity will be combined with the number entered by the user to produce the actual ISSI. Using this scheme, an Individual Short Subscriber Identity ISSI can be comprised of a fleet number part and a member part.

The terminal's own ISSI will be used as 'leading digits' for the digits omitted by the user. Thus, if for instance:

Terminal's own ID: 1234567

User Enters: 890
SSI sent will be: 1234890

The following call types can use SSI for identifying users:

- Full-duplex Private Call: called party and calling party identification
- Half-duplex Private Call: called party and calling party identification
- Group Call: calling party identification and talking party identification
- Mobile Status: called party and calling party identification
- Short Data Bearer Service: called party and calling party identification
- Text Message Service: called party and calling party identification

Benefits:

❑ Quick and easy setup of calls: User do not have to dial and remind on the full subscriber numbers

12.2 Direct TETRA ID Addressing

12.2.1 ISSI

Regardless of the short addressing scheme used, if the user is provisioned with the capability of entering a real TETRA ISSI, and the user enters an ID of 7 digits, the number will be interpreted as a real TETRA ISSI.

13 PEI Characteristics

The terminal supports a eight-wire serial RS232 / V.24 interface via the optional data cable, and a pre-defined set of the AT commands.

Note: The set of AT commands is not compliant with the TETRA PEI standard [Ref 4].

The terminal also supports 4-wire applications.

13.1 Physical Layer

The terminal PEI physical layer is the EIA-232 E Interface (RS232/V.24) and supports the following circuits as specified in [Ref 23]:

- Transmit Data (TD)
- Receive Data (RD)
- Request To Send (RTS)
- Clear To Send (CTS)
- DCE Ready (DSR)
- DTE Ready (DTR)
- Carrier Detect (CD) (Received Line Signal Detector)
- Ring Indicator (RI) (Never Asserted)

The connection with the data device and opening of the PEI port is done when the user turns the external device option on from the menu.

13.1.1 Baud Rate

The terminal supports the standard PEI baud rates specified in [Ref 23] from 300 bps to 115200 57,600 bps.

The auto baud rate detection mechanism is not supported.

13.1.2 PEI Flow Control

The terminal provides hardware flow control when the data traffic flows in the direction TE2 to MT2. The flow control will use the RS232 request to send (RTS) and clear to send (CTS) lines.

13.2 PEI Link Layer

The terminal supports AT commands and PPP [Ref 19] as a link layer between the TE2 and MT2.

PPP negotiation will use unnumbered mode only.

The AT phase is compatible with the MS-Windows standard modem type.

13.3 AT Commands

13.3.1 General AT Commands

The terminal supports the following general AT Commands:

- DTR Behavior (&D)
- Local Command Mode Echo (E)
- DTE-DCE character framing (+ICF)
- DTE-DCE data rate control (+IPR) (Baud Rate)
- Control flow control (+IFC)
- Restore Factory Default Configuration (&F)
- Restore Default Configuration (Z)
- Terminal Success Reply (OK)
- Terminal Error Reply (+CME_ERROR)
- Reboot the Terminal (R)

13.3.2 Packet Data AT Commands

The terminal supports the following AT Commands for support of Packet Data:

- DCD Behavior (&C)
- Setup a PPP link for Packet Data and/or TNP1 session (D)
- Select DTE-side stack (+WS45)
- Select WDS-side stack (+WS46)

13.3.3 Status and Short Data Service in TMO & DMO AT Commands

The terminal supports the following AT Command for support of Status and Short Data Service in TMO & DMO:

- Defining SDS Parameters (+CTSDS)
- Sending SDS, Status, Alarm and layer2 acknowledgement (+CMGS)
- Receive SDS, Status and Alarm (+CTSDSR)
- PID registration/deregistration, Send SDS, Status, Alarm (+CMGS)
- Receive SDS, Status and Alarm(+CMT)
- Message mode (+CNMI)
- Supported SDS types (+CSDS)

Note: Depending on Codeplug setting "ETSI AT SDS/Status Format" defined in section 29.6.3, the radio supports an ETSI compliant format or a Motorola Proprietary format. DMO SDS AT commands are only supported in the Motorola Proprietary format.

13.3.4 TNP1 AT Commands

The terminal supports the following AT Commands for support of TNP1:

- Setup a PPP link for Packet Data and/or TNP1 session (D)
- Set the UDP/IP Link to Local Mode (+WS46=252)
- Set the UDP/IP Link to Wide Mode (+WS46=14)

13.3.5 TETRA Modes AT Commands

The terminal supports the following AT Command for support of TETRA Modes:

- TMO/DMO Operating mode (+CTOM)

13.3.6 Group Management AT Commands

The terminal supports the following AT Command for support of Group Management:

- Talkgroup selection (+CTGS)

13.3.7 DMO AT Commands

The terminal supports the following AT Command for support of DMO:

- Visible DMO Gateway or Repeater (+CTDGR)

13.3.8 USB support

The terminal supports flashing of the software, codeplug and encryption material via USB interface.

13.3.9 Network and Mobility Management AT Commands

The terminal supports the following AT Command for support of Network and Mobility Management:

- Network Registration (+CREG)
- TETRA Cell Broadcast Information (+CTBCT)
- Cell Signal Quality (+CSQ)
- Neighbour Cell Information (+GCLI)
- Radio User Assignment (+CTRUA)

13.3.10 Identity Management AT Commands

The terminal supports the following AT Command for support of Identity Management:

- MT Manufacturer Identification (+GMI)
- MT Revision (+GMR)
- MT Serial Number (+GSN)
- MT Hardware Model (+GMM)
- Fixed TETRA Identities (+CNUMF)
- Talkgroup List by Folder and DGNA Notification (+CTGL)

13.3.11 Service Profiles & Capabilities AT Commands

The terminal supports the following AT Command for support of Service Profiles & Capabilities:

- Service Profiles (+CTSP)
- MT Capabilities (+GCAP)

13.3.12 Call Control in TMO AT Commands

The terminal supports the following AT Command for support of Call Control in TMO:

- Defining Call Parameters (+CTSDC)
- Call Transmit Demand (+CTXD)

- Call Transmit Cease (+CUTXC)
- Call Connect Notification (+CTCC)
- Call Transmission Grant (+CTXG)
- Call Release Notification (+CTCR)
- Incoming Call Notification (+CTICN)
- Call Progress Notification (+CTOCP)
- Call Transmit Cease Notification (+CDTXC)
- Call Transmission Interrupted Notification (+CTXI)
- Call Transmission Wait Notification (+CTXW)
- Terminate/Hangup call (H)
- Initiate a Call (D)
- Answer Hook Call (A)

13.3.13 Audio Control AT Commands

The terminal supports the following AT Command for support of Audio Control:

- Speaker Volume Control (+CLVL)

13.3.14 Accessory Control AT Commands

The terminal supports the following AT Command for support of Accessory Control:

- Handset on/off hook detection (+HHD)

13.3.15 Emergency Mode AT Commands

The terminal supports the following AT Command for support of Emergency Mode:

- Emergency Mode enter/exit (+EMER)

14 Supplementary Services

Following is the description of the TETRA Supplementary Services (SS) that the terminal supports in TMO Mode.

14.1 Dynamic Group Number Assignment (DGNA)

The terminal supports the dynamic addition and removal of talkgroups in its talkgroup list via TETRA Dynamic Group Number Assignment and De-assignment signalling (SS-DGNA). The terminal responds to the DGNA directed to it, or to the DGNA directed to the group to which it is attached.

14.1.1 Adding a Talkgroup

When a dynamic group number assignment adding a new talkgroup is received, the terminal adds the group to the end of the talkgroup list in its code plug. The user is then able to scroll to the talkgroup, select it and attach to the group.

If the dynamic talkgroup list is full when adding a new group, the operation will be rejected by the terminal.

14.1.2 Removing a Talkgroup.

When a dynamic group number de-assignment is received, the talkgroup will be removed from the talkgroup list in the terminal's code plug. When the selected talkgroup is de-assigned, the terminal will show 'No Group'.

14.1.3 DGNA Notification to the User

When the DGNA operation is successful, the user will be notified about the operation (e.g. group added, group deleted). The notification to the user will be displayed until it is acknowledged by the user and the message will still be displayed during call reception until it is acknowledged. (The motivation is to make sure that user could see the notification).

Upon viewing an assigned talkgroup notification, the terminal will provide the ability for the user to make that group the active group.

14.1.4 Selection of DGNA Groups

When viewing a list of new received DGNA groups the user can select any new group right away by pressing the select button. Previously it could be time consuming to add newly received DGNA groups.

Benefits:

- Ease of use, must faster selection of DGNA groups when initially received

14.1.5 Group Addressed DGNA

The terminal will support Group Addressed DGNA for the purpose of supporting the Dimetra-P Console Multi Select (MSEL) and Group Patch mechanisms.

The terminal will support the reception of a DGNA Assignment that is addressed to its selected group as a ***Super Group*** of the selected group. All signalling addressed to the Super Group will be monitored in addition to signalling addressed to the selected group, any announcement or associated groups and groups in the active scan list.

When the selected group is unselected, the terminal will cease processing signalling to the Super Group that was associated with that selected group.

The lifetime of the Super Group is received by the terminal as part of the assignment signalling. If a subsequent assignment to the same group is not received within that lifetime, the terminal will cease monitoring that super group.

The terminal will also support Super Groups of scanned groups, such that a group addressed DGNA assignment, received on one of the scan group addresses, will cause the terminal to monitor all signalling addressed to that super group as long as the scan group is being scanned and as long as the Super Group lifetime lasts.

14.1.6 DGNA Limitations

The following DGNA functionality will not be supported

- Call-related DGNA will not be supported.
- The terminal will not support functionality of the “authorized user”
- The terminal will not perform any network authentication before accepting DGNA.

14.2 Ambience Listening (AL)

This provides an authorized user (a dispatcher etc.) with the ability to cause a terminal to transmit without giving any indication to the user and monitor the audio activity picked up by the terminal’s hot microphone. In scenarios where Ambience Listening is activated, a higher mic gain can be automatically selected to increase pick-up of “ambient” conversation.
AL is a special Individual Call to a user‘s terminal.

14.2.1 Call Maintenance

The terminal does not restrict the duration of the call.

14.2.2 User Actions

If the user requests a call set up, the AL (Ambience Listening) call is immediately dropped and the user’s call will be initiated.

The terminal allows the user to perform other interface functionality that and will not release the call, including access to most menu items, changing modes, changing talkgroups and the activation/de-activation of scan lists. During talkgroup change, the terminal will appear to be performing the attachment, but the signalling will only happen after the Ambience Listening call has been terminated and no indication will be given to the user, unless attachment fails.

14.2.3 Pseudo Power Down

If the user powers down the terminal, all indications will be extinguished and the terminal will appear to have powered down. In reality the terminal is still active in transmit mode for the Ambience listening call and the will only shut down on call completion.

If the user again powers up the terminal from its pseudo powered down state, it will go through all the power up indications as though powering up.

14.2.4 Call Termination

The AL call is disconnected when the Emergency Button is pressed, Transmit Inhibit engaged, or DMO entered. Also the initiator can close the AL call.

Benefits:

- ❏ User Safety especially in Lone Worker scenario or at scene of incident to keep dispatcher operator informed

- ❏ All AL actions are controlled & logged appropriately in the infrastructure

14.3 Pre-emptive Priority Call (PPC)

If during a call, a call set up is received for a call that has a higher priority than the present call and the new call is Pre-emptive Priority 3 or Pre-emptive Priority 4 (Emergency), the terminal will release the present call and join the new high priority call.

If the call priority of the new call is either Pre-emptive Priority 1 or 2, the terminal will either accept or reject the call based on a pre-programmed setting. If the new call is accepted, an alert tone is sounded and a high priority call indication will be displayed to alert the user to the new call.

If the terminal has been programmed for pre-emptive call priority and the user initiates a private/ phone call which is rejected, the terminal will display the option to initiate the call again but this time with pre-emptive call priority. The pre-emptive priority level is set during terminal programming via the CPS interface.

Benefits:

- ❏ Allows dispatcher / key personnel to interrupt users engaged in private or telephone calls without delay
- ❏ Dispatcher can always get through to critical users: Previously when a dispatcher has an urgent or emergency situation and needs to immediately co-ordinate people, some users in a private or telephone call cannot be contacted {send a text message only}

14.4 RF Sensitive Area Mode (Transmit Inhibit Mode TXI)

RF Sensitive Area Mode, also known as Transmit Inhibit (TXI) Mode, is a user selectable mode that enables the terminal enter areas where radio transmissions are forbidden, e.g. hospitals, airplanes, etc., where safety can be jeopardized due to the terminal uplink radiation. Once in TXI mode, the terminal will not transmit under any circumstance and the user will be prevented from initiating any non-emergency calls or service.

TXI mode is deactivated explicitly by the user, or is implicitly deactivated when the user initiates an for Emergency call.

The user will be able to enter TXI mode and exit TXI mode via a menu sequence or one-touch button and upon entry into or exit from the TXI mode and provided that the terminal is ‘camped’ on a cell, it will send a specially designated SDS Status message to indicate to the system that it is entering or exiting TXI mode.

The terminal provides user indications when it is in TXI mode.

Mobility procedures that do not require the terminal to send an uplink transmission are performed, but cell reselection will not be performed even if no registration is required.

In TXI mode the terminal will join group calls for any monitored group(s), but prevents the user from transmitting on that call. The terminal will also display any incoming SDS messages to the user.

To allow the user to know what calls have been missed, The missed call feature is active in TXI mode and the terminal will attempt to prevent call setup retransmission from being recorded as separate calls.

If the user initiates an Emergency call, the terminal will immediately leave TXI mode and start the Emergency Call.

On power up, after powering down in TXI mode, the terminal offers the user the choice of continuing in TXI mode.

Benefits:

- ❏ Emergency calls still supported: If a user encounters a threat, the Emergency button will still operate.
- ❏ Status when entering / exiting Tx-I mode: Alerts dispatcher that user is “out of comms”. Also provides vital evidence that user is in TxI if required for later use.
- ❏ User alerted to incoming calls – Group calls still received: Even though terminals cannot acknowledge calls, the user is still alerted if someone if trying to reach them. Group calls still received. Private or Telephone calls stored in “Call History”
- ❏ Incoming mail messages received and accessible: Intelligently processes repeated Mail messages - allow user to receive SDS messages

14.5 Other Supplementary Services

14.5.1 Calling Line Identification Presentation (CLIP)

This feature will display the number of the calling telephone on the called terminal’s display, the terminal will attempt an ID look up in its Phone/PABX lists for a match, if a match is found, the terminal will display the name/alias of the caller.

The PDUs and facility elements for this subscriber signalling will **not** be supported, but Identification Presentation functionality is supported in most cases using the information found in the call setup messages.

Benefits:

- ❏ This can enable the user to decide on acceptance of a call based on the callers identity prior of the call
- ❏ Focus on important communication: Unwanted or low priority calls can be prevented on demand

14.5.2 Late Entry (LE)

This is a Group Call feature only and it enables group members to join a call when it is in progress. The system periodically sends out the group call set up information, thus allowing terminals that have been involved in other calls or have just moved into the coverage area to join the call.

Benefits:

- ❏ No communication of selected Talkgroup will be missed: User who have finished a private or telephone call will automatically connected to a current call of the selected Talkgroup

14.5.3 Talking Party Identification (TPI)

This feature will display the ID of the calling terminal on the called terminal’s display, the terminal will attempt an ID look up in its Private Call list for a match, if a match is found, the terminal will display the name/alias of the caller.

The PDUs and facility elements for this subscriber signalling will **not** be supported, but Identification Presentation functionality is supported in most cases using the information found in the call setup messages.

14.5.4 Calling Line Identification Restriction (CLIR)

CLIR is currently not supported in the terminal.

15 GPS Support

The terminal is equipped with a GPS receiver with which enables it to ascertain its own location.

The terminal provides Location Reports in various circumstances:

- On request;
- Triggered by specific events (e.g. status transmissions, emergency, power on/off);
- At specified time intervals;
- At specified distance intervals.

The reports are sent using a protocol which is based on existing standards, using SDS as a transport layer. SDS User Defined Data Type 4 and the customer can provision the terminal to either use SDS-TL (for added reliability) or no SDS-TL (for saving air interface resources). The TETRA standard Protocol Identifiers for GPS will be used - 3 for simple GPS (no SDS-TL) or 131 if SDS-TL is used.

The location data are stored in the non-volatile memory of the terminal, for later retrieval.

If the terminal is provisioned to provide user indications, the user is notified of the feature's operational status.

If the terminal is provisioned with to provide the terminal user with position information, the user will be able to view the terminal's position and the status of the satellites that are in view.

The GPS feature can be enabled or disabled as a whole by the CPS. Also, the parameters of the feature can be configured by the CPS, or over the air. CPS configuration provides a default profile, which can be overridden by commands received over the air. The profile assigned to the terminal will determine when to send location data, what data to send with what accuracy and to what address to send the data.

All data requests and configuration commands received over the air are checked to confirm they have come from a trusted source. Only ISSIs in a specified range may send location commands.

Note: Both the terminal and application receiving location messages from the terminal have to be configured with the same protocol ID otherwise the terminal will report a failure when requested to send an Immediate Location Report for example.

16 MMI Features

16.1 Dialing Modes

The terminals have a separate dialing mode for each type of call. In order to make a call, the user switches to the appropriate mode, and makes the call. The dialing modes are:

- Group Mode
- Private Mode
- Phone Mode
- PABX Mode

If the terminal is provisioned as auto-mode-switch operation, when an incoming call is received the terminal will automatically switch to the appropriate mode. If the terminal is not provisioned for auto-mode-switch, when an incoming call is received, the terminal will alert the user, and the user must manually switch to the appropriate mode to answer the call.

16.2 Programmable Buttons

It is possible to program keypad buttons and other option buttons with the followingh 11 options:

- Start a call to a designated private ID, phone or PABX number
- Enter/exit TXI mode
- Hi/Low Audio selectable when terminal is held close to or away from the face
- Select a designated talkgroup and go to group mode
- Select Latest Previously Selected Talkgroup
- Send a Status Message to a designated ID
- Switch between TMO & DMO operation
- Talkgroup Scan enable/disable
- Home Revert
- Enable/disable scanning
- Unassigned

16.3 Backlight for Display

A flexible backlight setting is provided by the terminals which are pre-programmed via CPS and editable via the terminals menu:

Disabled: No backlight (for covert type operation)

Manual: On/off

Semi-automatic: Turns on for a programmable timer period when activated

Automatic: Turns on for a programmable timer period when buttons are pressed or calls received

Benefits:

- ❑ Appropriate setting to fit most customers needs
- ❑ Automatic Backlight saves energy without intervention of the user

16.4 Covert Mode

The Covert Mode feature is designed to give to the user ability to switch the audio to earpiece and to:

1. dimmed (21%) display
2. grayscale colors on the display.

When Covert Mode is turned on the terminal

- sets all tones to Off (corresponding to All Tones menu entry)
- sets group audio to Speaker Controlled (corresponding to Group Audio menu entry)
- sets private speaker to Off (this will cause all calls to be routed via Earpiece)
- sets backlight to grayscaled and dimmed
- switch off LED

The terminal powers up in the mode it was before power down, therefore the terminal powers up in Covert Mode if it was set before power down.

16.5 Dialing Scheme

The private ID number is a number with up to 16 digits. If the user enters less then 16 digits it is padded to full ITSI with leading zeros. It is composed with MCC (Mobile Country Code), MNC (Mobile Network Code) and ISSI (Individual Short Subscriber Identity).

MCC	MNC	ISSI
16-14	13-9	8-1

Two options are given to the user:

• Fixed - user may provide up to 16 digits which include the MCC, MNC and ISSI numbers or if less than 16 digits are entered, it will be filled with the digits that are set by the service provider.

• Automatic - you need to provide up to 8 digits. If the user provides more it will switch to fixed mode. If the user provides less then 8 digits, the radio fills the rest of the number with its own ISSI. The rest of the 16 digit number is automatically given by the radio.

If you select more then 16 digits the display will give you a warning about an incorrect input.

16.6 Languages

The terminal is capable to provide support for the following languages using ISO/IEC 8859-1 Latin 1 (8 bits) alphabet:

- English
- German
- French
- Spanish
- Dutch
- Swedish
- Croatian
- Danish
- Dutch
- Hungarian
- Italian
- Korean
- Lithuanian
- Macedonian
- Norwegian
- Russian
- Simplified Chinese
- Traditional Chinese
- Swedish
- Russian (Cyrillic) (Standard Control Head only)
- User Defined Language *)

*) In addition to these languages, the terminal will provide an option to use a "Local Language" where each text string used by the terminal is defined in the code plug

Benefits:

- ❑ Easy to train user speaking different languages to operate and understand the terminal and menu
- ❑ Prevents user errors and irritations due to unknown languages of terminal messages
- ❑ Flexible: Can support any other language which is based on the character set mentioned above

16.7 Scanning

The passive scan functionality has been replaced with active scanning. Whenever scanning is enabled/disabled, a status message is sent.

Scanning of only the Group Area (cell to Cell) is supported.

16.8 Non Tactical Emergency to Emergency

This feature allows users to set up an emergency call to a designated talk group (a pre-defined talk group). This feature is an alternative to the normal emergency group call operation where the call is set up to the selected Tactical Emergency talk group.

The Tactical and Non-Tactical operational mode and Non-Tactical talk group GSSI are selectable via the CPS during terminal programming.

The Hot Microphone feature operates normally, when enabled via the CPS.

Note: This feature is not supported on all systems.

16.9 DGNA Enhancement

DGNA now has scan functionality. The terminal also supports SwMI (system) intitiated attachment/ detachment to a group and SwMI initiated scan functionality during attachment/detachment to these groups. This is a supported system feature that may not be available on all systems.

16.10 DGNA Auto Attach

DGNA enables a network operator or authorised user to dynamically (over the air) allocate talk groups to selected terminals.

Using Supplimentary Service Messages (SS-DGNA), the terminal can becommanded to add talk groups to its existing list of talk groups, to attach or select these talk groups from the list, or modify parameters of existing talk groups.

DGNA Auto Attach or ‘Forced Attach’ enables a dispatcher to send a talk group to a user group that will then automatically join(affiliate to) the new talk group. No user actions are required as this is a dispatcher controlled operation.

This feature ensures that a dispatcher can quickly mobilise a team of terminal users as and when required to meet a current situation.

16.11 Favourite Talk Groups

This user friendly feature enables a user to create a ‘Personal Range’ of own talk groups from pre-programmed talk groups within the terminal and is saved in the terminal during power down.

It is a shared feature for both TMO & DMO operating modes and has a capacity of 16 talk groups for the End Stop MTM800 Enhanced model and 128 talk groups for all other terminal models.

16.12 Receiving Audio during Text Message Editing

When in a group call, the audio is no longer lost when composing a text message. It is now possible to hear the group call audio, but audio will be lost for a very short period of time as a result of the message transmission.

16.13 Talk Group Index Entry via the Keypad

The Talk Group (TG) Index feature can be entered via the keypad when only in either TMO or DMO talk group mode, in idle or receiving but nor transmitting.

In this mode the terminal does not look at the Talk Groups per range, but as consequtive numbers from the first talk group of range 1 to the last talk group in the last enabled range. i.e. 4 ranges of 16 talkgroups is equal to a list of 64 continuous talk groups, where a keypad entry of 17 equates to the first talk group of range 2.

To enable this functionality, the required keypad presses are of a shorter duration than that required when using the one touch button functionality.

Once the first digit has been entered a ‘Find’ soft menu appears and on completion of the talkgroup digit entry, pressing the associated soft button will cause the talk group to be displayed. Once the talk group is displayed, the user is then presented with the ‘Cancel’, ‘OK’ selectable soft button options.

Selecting ‘OK’ will attach the terminal to the group, or pressing the PTT will attach the terminal to the group and set up a call to that selected group.

The terminal will actively remain on the last selected talk group during the search process and calls can be heard and answered via the PTT while the search screen is still displayed, thus allowing the user to complete the talk group selection process.

Incorrect keypad entries are cleared using the ‘Clear’ option of a soft button.

It is also possible to enter a known talk group GSSI via the keypad and press the PTT to set up a call without using the search functionality above.

16.14 Universal Time Display

The terminal is capable of presenting time information to the user. The time is derived from an internal clock. The terminal maintains the clock both when the terminal is powered on and powered off.

Note: In case of power loss (e.g. flat battery) the internal clock will not be maintained.

The time is received from the SwMI and is updated if the maximal deviation between time on the internal clock and the time received is less than a value set during terminal programming via the CPS interface and if the System Update is not set to Off via MMI.

The feature is enabled or disabled and the default configuration set for the terminal via the CPS interface and in the MMI.

The terminal display supports:

- Twenty-four-hour and twelve-hour formats

- YY/MM/DD, DD/MM/YY, MM/DD/YY and DD-MON-YY date formats
- Adjustable time offset

The time information can be changed by the user via MMI, if enabled in codeplug.

System broadcast information has higher priority than data entered manually. Hence time, date and offset information entered via MMI is overwritten, when data is received from the SwMI. This happens only if the System Update via the MMI is set to Time & Offset.

System broadcast information can be set via MMI. the radio gives you three options:

- Off - radio will not use the system broadcast update
- Time only - radio will update only the time from the system broadcast update
- Time & Offset - both are going to be updated from the system broadcast update

The terminal provides user indications upon crossing to another time zone, when new MCC broadcast received.

Benefits:

❑ Time displayed can be synchronized for a number of terminals.

16.15 Test Page / Test Mode

Note: The Test Mode option must be enabled in the terminal via CPS programming and selecting the “Test Page” option. The Test Mode is only for use by authorized persons, and not by users.

Use the following terminal key sequence, by pressing each button in turn, to access “Test Mode”:

- **Cursor right** , **1** , **Menu**, **2** , **Menu**, **3**.

Note: If the Test Mode option is not enabled via CPS programming you have only access to the KVL Mode options **KVL On** or **KVL Off**.

The following are the services offered by test page:

16.15.1 Ver info

Displays software/hardware version information:

- Build Date
- CodePlug Version
- DSP Software version
- Host Software version
- Hardware ID
- Equip ID
- LLS version
- UCM Ver

16.15.2 Addresses

Displays the following:

- Home MNI
- Group ID

- Own ISSI
- ASSI

16.15.3 Error logs

Displays information about software errors:

- Error log
- Fatal
- Reset
- UCM

16.15.4 Cell Info

This option displays information about the foreground and Background cells. This menu will display the RSSI levels of the cells.

16.15.5 Cell lists

Displays frequency lists:

- Frequency list 1 (32 variable frequencies)
- Frequency list 2 (32 fixed frequencies)
- Frequency list 3
- Frequency list 4

16.15.6 Data Services

This allows access to Airtracer enable, Conformance tests, KVL Mode and E2E Key deletion:

- Airtracer
- Conf Test
- KVL mode (for Air Interface Encryption - AIE)

  Note: The terminal software was changed for MR5.3 to have a new display content in the KVL mode for distributing AIE keys.

  The KVL mode for AIE keys is entered as before. The new behavior is that the display is immediately dark and empty, but the **green** LED is ON.

  During data exchange with the AIE KVL the **orange** LED will be ON. On successful key exchange the **green** LED will be ON again.

  In any error situation the **red** LED will be ON. You can leave the KVL mode by pressing the power button.

  The communication via the serial interface to the AIE KVL is as before.

  Terminal Software Upgrade: (refer to Chapter 3 of the Product Information Manual, Paragraph "Upgrade Phone")

- E2E Key Del (depending on UCM configuration)

  Deleting E2E Traffic Keys

The traffic keys (all keys except the KEK) can be deleted from customer and engineering test page. If customer test page is enabled then this option will be accessible from main test page. If engineering test page is enabled this option will be accessible under Data Svc menu option.

After deleting the keys all groups will have encryption mode set to off and the encryption icon will be cleared. For private numbers the icon will be still displayed (contacts list) since the encryption mode for private numbers is taken from codeplug.

Deletion of all keys

The key deletion key sequence " ****00##** " includes deletion of all the UCM key sets (including the KEK, GEK and SEK).

Displaying UCM Version Information

UCM version number can be accessed from Ver Info menu item. After selecting UCM version option the UCM Version and Algorithm IDs will be listed. If the number of algorithms is more than what can be displayed on the screen then the user can cycle through them by using the navigation keys.

Displaying UCM Error Log Information

UCM Error Log option can be accessed from Err Logs menu item. After selecting UCM Error Log option the UCM error logs will be listed. The user can cycle through the error logs by using the navigation keys. Every log will have a number (Log[n] and a Log value). The user is able to clear the logs by selecting the left soft key (Clear). If no logs are available a notice with 'List Empty' string and the right soft key (Back) will be shown.

16.15.7 Key Information

This option allows displaying the security information for the following conditions.

- For Serving Cell:
  - Security class of the serving cell, i.e. Security Class 1, Security Class 2, Security Class 3, Security Class 3 with GCK
- For Group OTAR:
  - CMG GTSI
- For SDMO and TM-SCK OTAR:
  - SDMO SCK Subset Grouping Type
  - Current SDMO SCK Subset Number and SCK-VN
  - Current Fallback TMO SCK, i.e. SCKN and SCK-VN attributes
  - List all SCKs stored in the MS, i.e. SCKN and SCK-VN attributes
- For GCK:
  - Current Full GCK-VN
  - List all GCKs stored in the MS, i.e. GCKN and GCK-VN attributes

16.15.8 Memory (if enabled in codeplug)

Contains the following options:

- Host Memory
- DSP P-Memory

- DSP X-Memory
- DSP Y-Memory

17 Call-Out

17.1 Feature Overview

It is alert that is sent to one or many users when the incdident requires immediate attention. Only the Emergency Mode has higher priority then Call-out. When the user receives the alert, three responses are availabele:

1. **Accept** - additional information from the dispatcher will be displayed
2. **Stand by** - voice and message communication will be the same as in **Accept**
3. **Reject** - display will return to the home display and the talkgroup will be selected to the one before the Call-out.

17.1.1 Addressing Call-Out

Call-out alert can be addressed to:

- ISSI - individual
- ISSI - to a group via serial individual messages
- GSSI - group of users.

17.1.2 CO Box (Call-Out Box)

All incoming and outgoing Call-out messages are stored in CO Box and can be managed by the user. There is a two- level structure for the alerts. First level is the main alert list, as the second one are all the messages associated with the alerts. Both lists are displayed chronologically with the newest on top. The capacity of the CO Box is 10 call-out alerts and 100 messages (incoming/ outgoing). It has also the overwrite policy which will delete the oldest one upon receipt of an additional Call-Out message.

In normal mode, the user can browse the CO Box and read all the Call-Out messages.

In Call-Out mode, user can only read the ongoing Call-Out messages.

17.1.3 New Call-Out

When the new Call-Out is received by the radio, the old Cal-Out (even if has not been responded) will override the old one. An ongoing Call-Out overrides the old one in any phase of the Call-Out alert.

17.2 Phases

Call-Out service has 2 main phases:

1. Alert Phase
   User receives the alert with the associated messages and he/she is able to respond to it. Special tone is played by the radio when the alert is coming. All the messages provide the user with all important information about the incident.
2. Information Phase
   User is in Call-Out mode and is able to receive more messages about the incident with the text or voice. User can also query for more information using voice group call or Call-Out text function which enables to send a text message to the dispatcher host application. Voice message can be sent with the high priority as a group call. Users can answer back to the group or to the dispatcher using voice group call.

17.3 Exception Handling

17.3.1 Emergency mode

When user received Call-out alert while in Emergency Mode, message will be ignored.

17.3.2 Transmit Inhibit Mode (TXI)

The user is able to receive the message but it is not able to respond to it until TXI mode is deactivated. When the user decides to leave the TXI mode after viewing the message, the radio will prompt to accept, standby ot reject the call-out.

17.3.3 Direct Mode Operation (DMO)

Call-Out feature is not supported in DMO.

17.3.4 Fallback Mode

This mode is available when the user is in Local Side Trunking. The user who receives the Call-Out Call, enters Fallback mode, which includes only voice communication. The user can clear Fallback Mode only manually.

17.3.5 Call-Out test

Dispatcher is able to test this feature by using Call-out test. Radio will display ‘Call-Out Test’ and generate the alert tone. Only one soft key is available for the user with the label Test OK. After responding the display will return to its previous mode.

17.3.6 Storm Plan alert

This is special case of Call-Out because:

- it is sent out to the larger group of people
- user is able to respond with any key stroke and after that will be moved to information phase

It is sent several times to raise realiability.

18 Tool Interface Support

The terminal supports interfaces with external diagnostic and testing software.

18.1 Software and Codeplug Flashing Tool Support

Equipment specific parameters, and other data that is required to be retained through power cycling will be stored in non-volatile memory - known as the ’codeplug’. The terminal will support an interface with an external tool (such as CPS) that is capable of reading from and writing to the codeplug and flashing the terminal software via serial and USB interface.

18.2 Key Variable Loader (KVL)

The terminal supports provisioning of K, KEK and SCK via the KVL application. The terminal will store the K in sealed format using TA51.

Features and Benefits:

- ❏ Simultaneous K+SCK loading: Simplifies provisioning process, optimizing security
- ❏ Secure Key (SCK & K) provisioning in the field: Key loading can be done at user's premises, rather than centralized facility – the customer is in control of security
- ❏ K provisioning tools available to Service Provider/End Users: No need to return unit to manufacturer if key's erased
- ❏ Dial-up connection for Key provisioning tools: Fast, efficient and secure transport of data between field and central database

A KVL tool enables loading of encryption traffic keys (Static Cipher Key - SCK) as well as authentication key (K) into terminal in a secure manner.These keys (for AIE) can be loaded into the TETRA terminal when the KVL is connected to the terminal and the KVL mode in the terminal is enabled. Refer to Paragraph 16.15 "Test Page / Test Mode".

Chapter 3

CUSTOMER PROGRAMMING SOFTWARE (CPS)

1 Introduction

The TETRA CPS (R6x.490.02, July 23 2007, part no PMVN4152A - for MR5.7) is a Motorola software tool that runs on PCs, Laptop and Desktop computers from **Dell** and **Hewlett Packard** that use either Windows 2000® Professional or Windows XP® Professional. It is used for programming TETRA terminals.

Existing users will be familiar with the structure and layout of this CPS.

The structure of the CPS has been designed so that PC users who are familiar with Windows® will be more comfortable when first using the CPS.

The available menus and the editable option fields will vary by terminal type and how the CPS was opened. There are 2 ways of opening the software, as a User or as an Administrator.

The CPS work screen contains a reset column and if there is a reset button against a Field Value box, the user is able to reset the entered value to the factory default.

Note: The terminal (Mobile Subscriber - MS) is designed to work on all available TETRA systems and all the features explained in this chapter may either not be available in this software release, or not work on every system.

Note: Use only Dell or Hewlett Packard PCs, Laptop or Desktop computers**.**

Note: Before starting the CPS close all other open software applications.

Note: Do not try to load a codeplug into a terminal which is not compatible. Use the Copy Wizard which allows to copy codeplug data from one terminal (or from a codeplug or call list data file) into another compatible terminal.

2 Loading the CPS

This is a straight forward task, place the CD into the PC and follow the instructions.

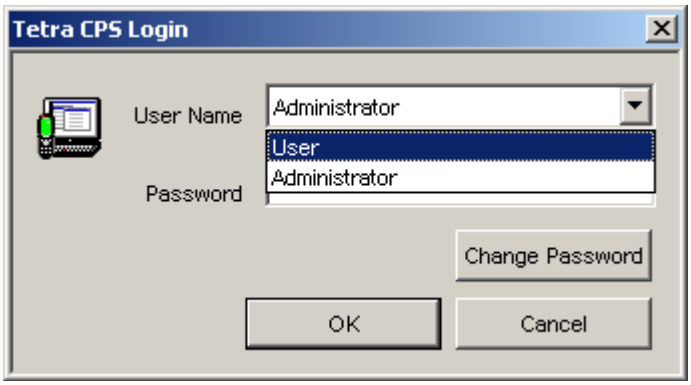
If there is an earlier version of CPS, it may be over written.

If it is necessary to keep the earlier version go to C:\Program Files\Motorola and add a new folder with the title version of the new software. When loading the new software, the person installing the software will be prompted for the location in which to store the CPS and one of two things will happen, either the installation program will have found the new folder and its path will be displayed on the prompt screen, or the person installing the software will have to select the ‘Browse’ option and manually find the new folder, after which the path will be displayed on the prompt screen. Select ‘Next’ to continue with the installation.

3 Starting the CPS Application

To start the CPS using the mouse, either double click on the Desktop CPS icon or select it via the Start\ Programs feature.

As the program starts, the Password Prompt is displayed. This has 2 login options:



Option 1.

User Name: **User**

Password: **user**

If this login option is used several sub menus and entry fields of the terminal's codeplug are not editable.

Option 2.

User Name: **Administrator**

Password: **admin**

Note: When this login option is used, only a few factory preset options of the terminal's codeplug are not editable and all other menus options are available.

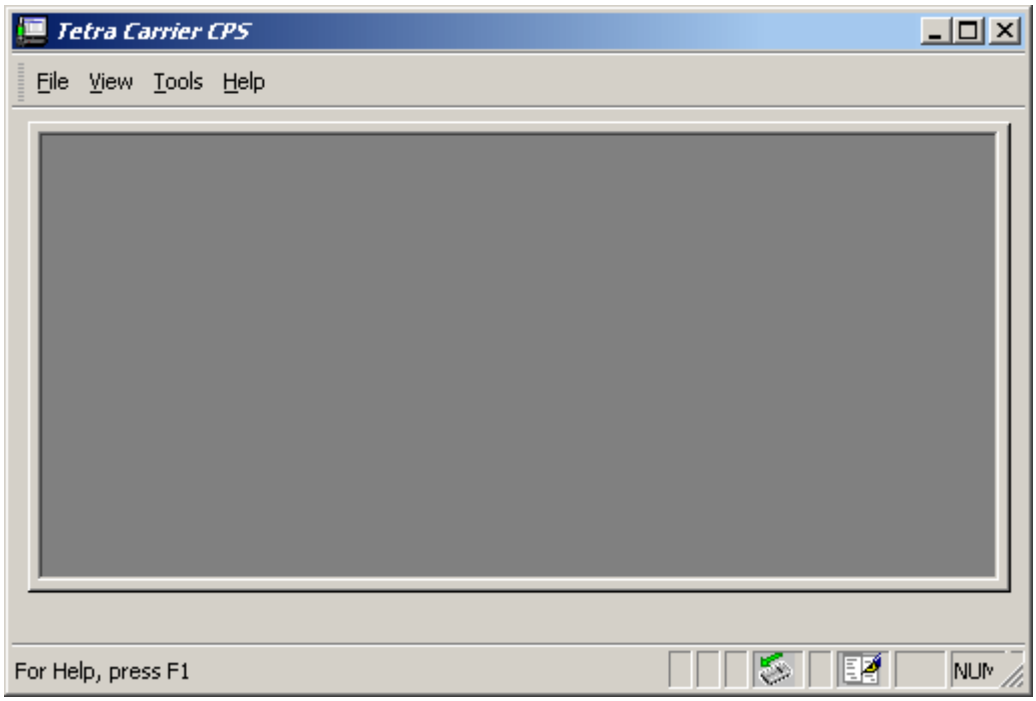
It is possible to change both passwords using the Change Password option before logging in

After selecting the 'OK' button of the login box, the main window will be displayed and inside of which will be displayed the Motorola TETRA CPS Logo.

'Greyed Out' icons are options that are not available until a terminal's codeplug has been read.

The administrator log in will be used for this document and all entry fields will be covered.

3.1 Administrator Opening Window



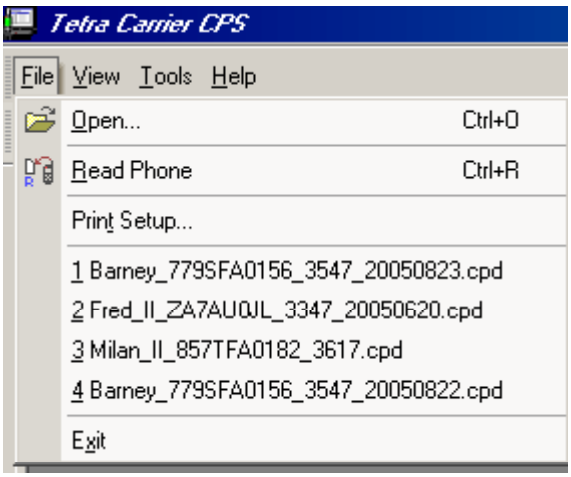
This window shows the title bar with the minimise, restore and close icons at the top. Below this is the File, View, Tools and Help bar, each of which when selected will open to display option menus.

Below this are displayed two icon bars on the same line.

The Main and Phone icon bars are displayed on this line and are selectable, deselectable via the View option menu. Placing the cursor over an icon will cause the icon description to be display directly below the icon.

The dark and larger portion of the screen is the main work area and at the bottom of the window is the Status bar, which again is also selectable, deselectable via the View option menu.

3.2 File Menu - with no codeplug displayed

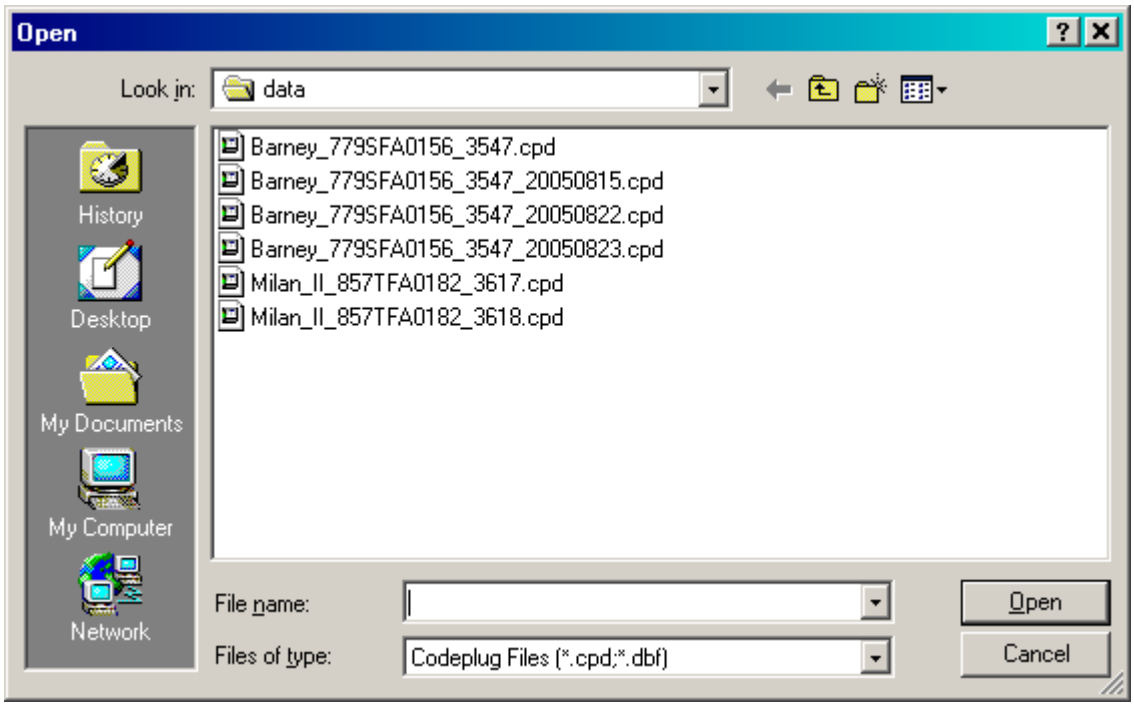


There are 2 sub menus associated with the File Menu. The first is shown above and is displayed when no terminal codeplug has been read, or loaded from archive. The options are:

3.2.1 Open

This option allows the user to select a previously archived codeplug.

1. In the File Open dialogue box, navigate to the drive and folder (or directory) where the codeplug file is located.
2. Then double-click the desired file name, or highlight the file name and click OK to complete the task. The codeplug contents will then be displayed in the CPS.
3. If the codeplug file is password protected, the CPS will display the password prompt to allow the correct password to be entered and the file to be opened.



3.2.2 Read Phone

Selecting this option will cause the CPS to read the codeplug of the connected terminal.

During this process the CPS will establish communications with the terminal (Initializing), verify the codeplug is compatible with this version of CPS (an older version of CPS will not read a newer version of the codeplug) and read it for display in the CPS window work area.

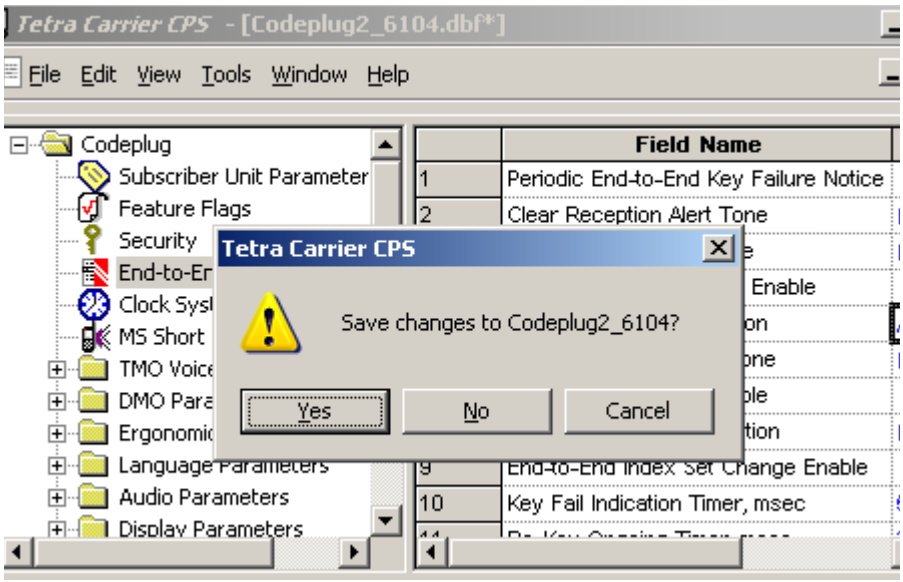
The codeplug is displayed in the 'Tree' format on the left of the screen. The trunk is made up of the available main menu items and as each is selected, it opens its sub menus as branches towards the screen centre. The sub menus may in turn have sub menus that also open to the right of the screen.

3.2.3 Print Setup

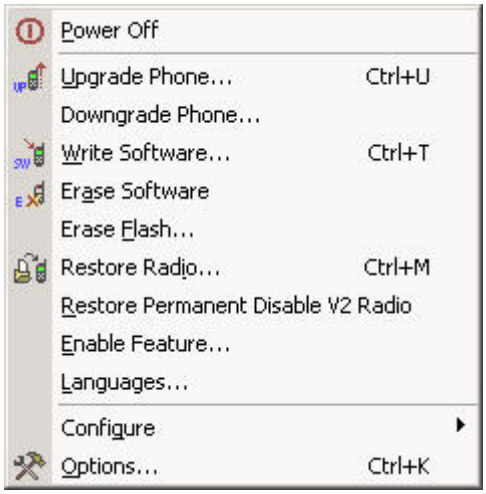
Selecting this option displays the 'Standard' PC print screen option window used for setting the printer parameters.

3.2.4 Exit

Selecting this option will close the CPS. if a codeplug is displayed in the work box and has been edited, the user is given three options about saving it.



3.3 Tools Menu - with no codeplug displayed



There is one sub-menu which is only visible with no codeplug displayed:

3.3.1 Enable Features

Whenever a feature paid flag is disabled, the CPS disables access to the fields belonging to separately priced features.

Some TETRA features (MSPD for MTM800 Enhanced) are separately priced in terminals from release MR5.3 on, apart from MSPD from MR5.4 on. The customer who has paid either for a single feature or for a number of features receives the Feature Enable kit, i.e. the Customer CPS and an

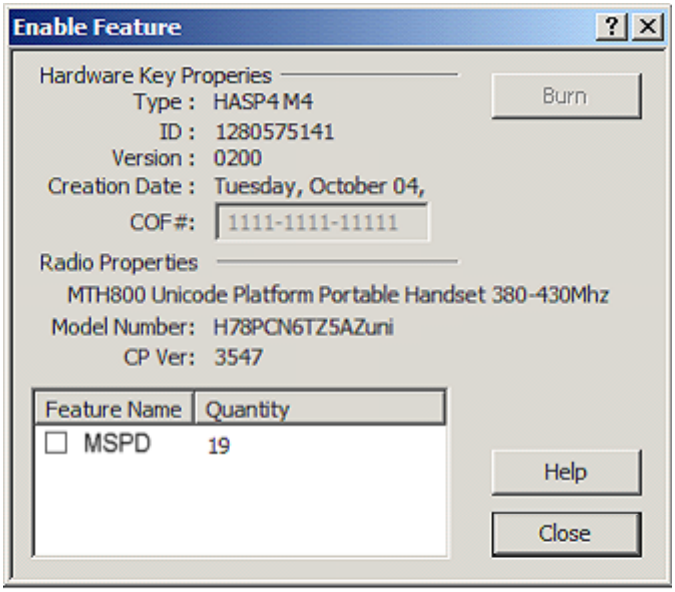
USB dongle ("Feature Enable Dongle") that contains information about the total number of enables per feature.

Feature enabling can be performed on one or more terminals simultaneously – all in one operation.

Proceed as follows:

1. Connect the terminal to the PC as described in the terminal's hardware set-up. The terminal's codeplug contains special block for keeping the list of feature paid flags, each of which corresponds to a separately paid feature.
2. Connect the Feature Enable dongle to the PC.
3. Run the CPS.
4. Enter the Administrator password.
5. **Note**: Do not read the terminal now!

   Select Tools/Enable Feature. The Enable Feature dialogue opens up and displays information related to the dongle and the terminal attached to the currently active port.

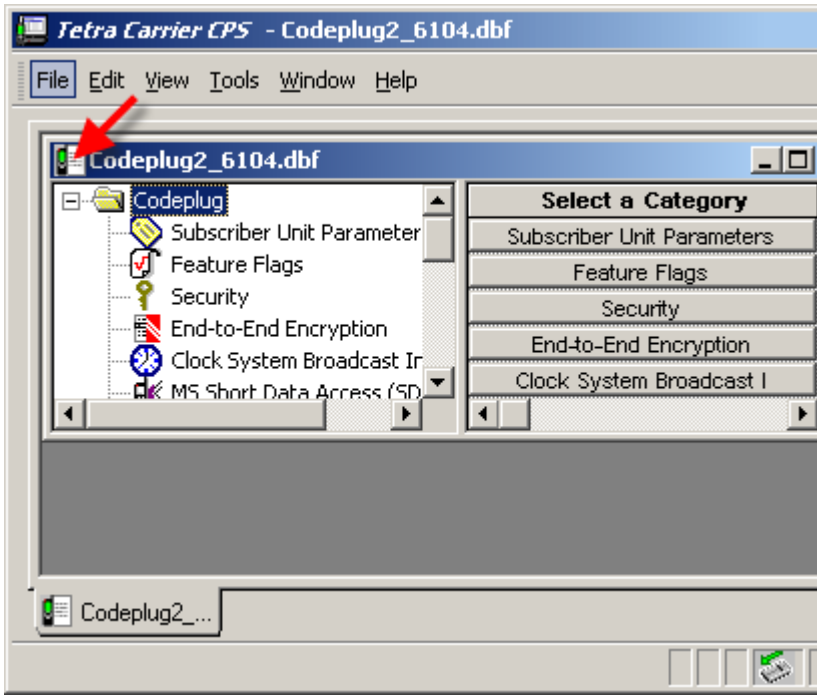


6. Enable the check box next to the feature you have paid.
7. Click Burn. Each counter will be decreased each time you enable one of the features you have ordered.
8. The CPS scans communication ports and detects the terminal that is connected to the port. The Operation Results message appears and displays the result of operations per each port. Click Continue button.
9. The CPS will display the operation result for each terminal.

Note: If all paid features are enabled in a dongle and several terminals are connected for simultaneous feature enabling. Some features may not have been paid for some of the terminals or may already have been enabled. The Customer CPS will automatically detect which features were paid or enabled for each terminal and will not decrease the counter.

3.4 Displayed Codeplug File

A new icon is now displayed with the codeplug and if the codeplug is maximised in the work screen, the icon will move to the left of the File option.



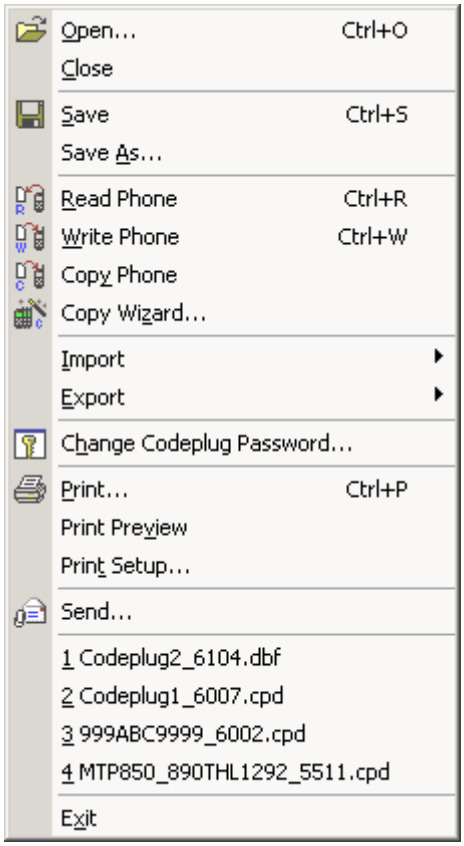
This icon, when selected, gives the following options:

The Restore, Move, Size Minimise and Maximise options are used to position or alter the size of the viewed code plug screen. I.e. if the screen has been maximised, selecting restore will return it to the size it was when first opened.

If two or more code plugs are displayed on the work screen, selecting the ‘Next’ option will high light the next code plug and make it the current active (for editing) code plug.

4 File Menu

All the available options with displayed codeplug are displayed below and only additions will be explained.



4.1 Open

This option allows the user to select a previously archived codeplug.

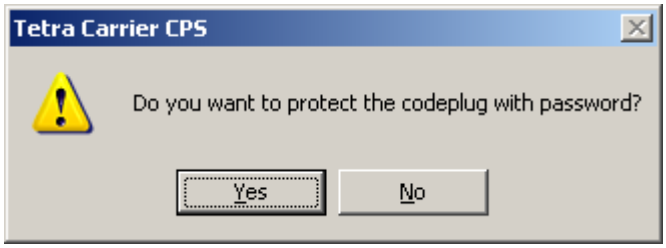
1. In the File Open dialogue box, navigate to the drive and folder (or directory) where the codeplug file is located.
2. Then double-click the desired file name, or highlight the file name and click OK to complete the task. The codeplug contents will then be displayed in the CPS.
3. If the codeplug file is password protected, the CPS will display the password prompt to allow the correct password to be entered and the file to be opened.

4.2 Close

Selecting this option will close the active codeplug and the user is given the option to save any changes made.

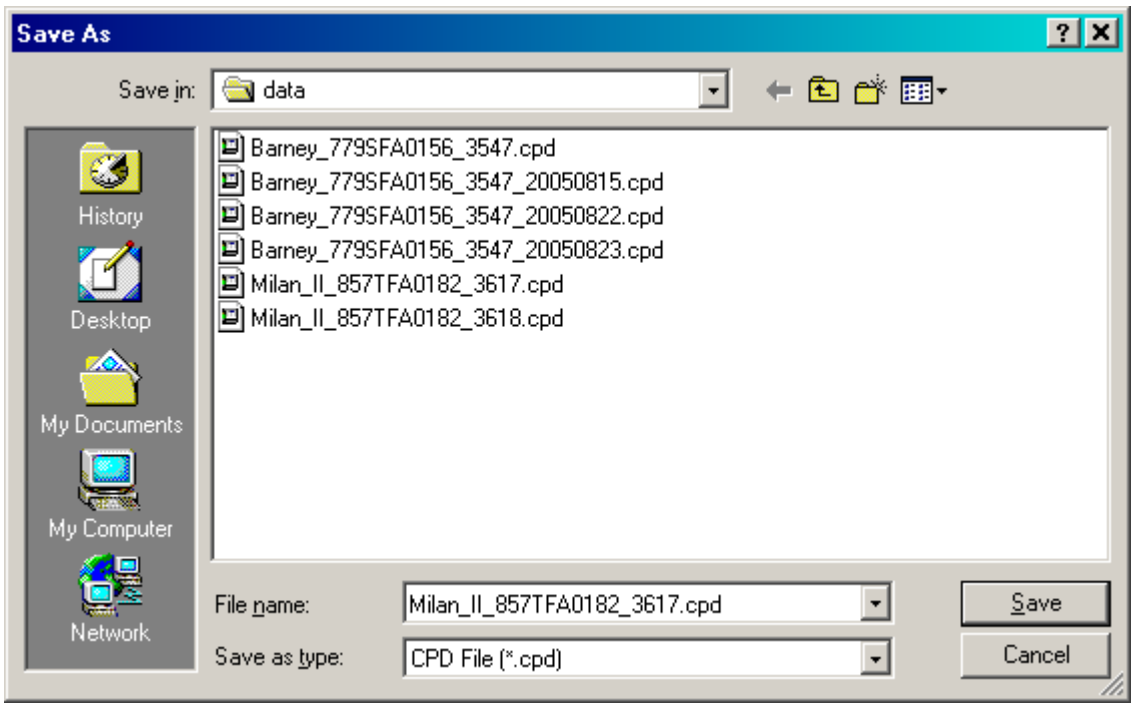
4.3 Save

If the code plug is already stored in the data folder, then selecting the save option will save changes that are made to the code plug file on the work screen in the stored file. The CPS will then offer password protection for the stored file.



4.4 Save As

This option is used for storing files for the first, or for keeping a record of successive changes made to a code plug. Selecting one of the five icons on the left of the screen will change the heading in the ‘Save in’ line to that of the selected icon, selecting the down arrow at the end of the ‘Save in’ line will give all available computer options. The three icons to the right of the ‘Save in’ line are standard Windows® options, go up one level, create new folder and view menu options.



4.5 Read Phone

Selecting this option will cause the CPS to read the code plug of the connected terminal.

During this process the CPS will establish communications with the terminal (Initializing), verify the codeplug is compatible and read it for display in the CPS window work area.

The codeplug is displayed in the ‘Tree’ format on the left of the screen. The trunk is made up of the available main menu items and as each is selected, it opens its sub menus as branches towards the screen centre. The sub menus may in turn have sub menus that also open to the right of the screen.

4.6 Write Phone

This option is used to Write codeplug data to (program) the phone while preserving the sensitivity field values, i.e. tuning data. Use this function only to write a codeplug that was originally read or loaded from the same phone, the source and target phones must be one and the same.

The CPS will display a progress bar and status messages as necessary.

CAUTION: Do not disconnect the programming cable from the phone during the write operation. This will destroy the terminal.

4.7 Copy Phone

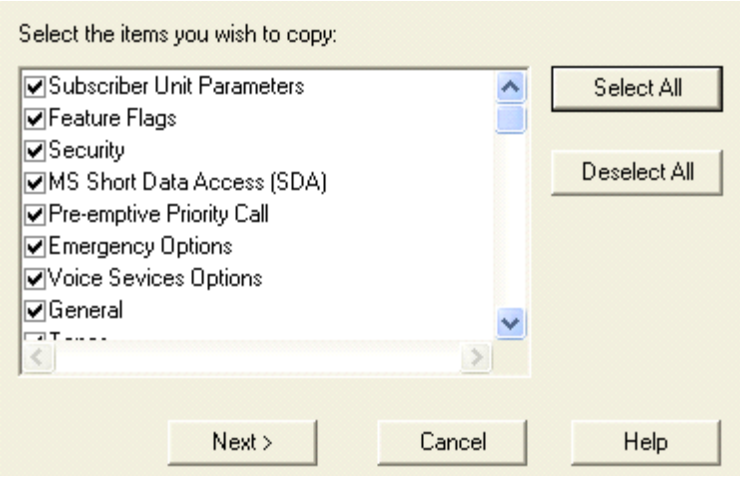
This option will copy the displayed codeplug to a connected terminal of the same model.

4.8 Copy Wizard

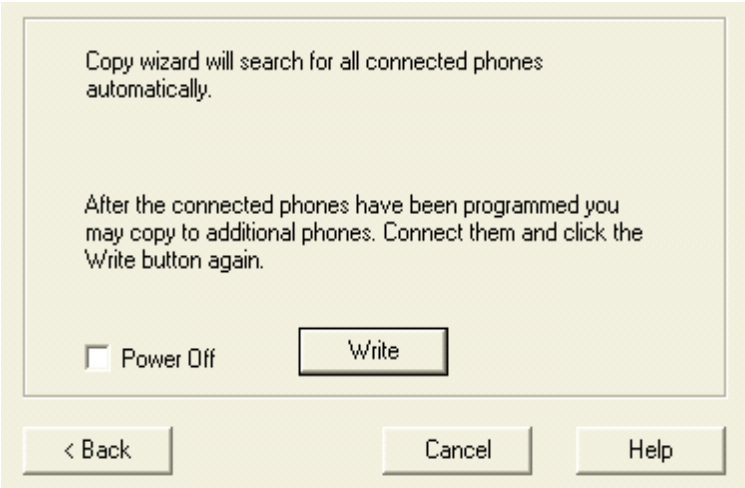
This is a 2 step feature that enables cloning of codeplug data from a master codeplug to one or more terminals of the same model.

Select the codeplug blocks (up to 55) to be copied and write the codeplug data to one or more terminals - all in one operation.

This function is used only for compatible terminal models - i.e.terminals belonging to the same frequency range and operating in the same network.



TIP: Use Copy Wizard to clone multiple terminals with the same set of codeplug data. The master codeplug is read from the master terminals and activated in the CPS window. Connect the next terminal(s) and click the Write button.

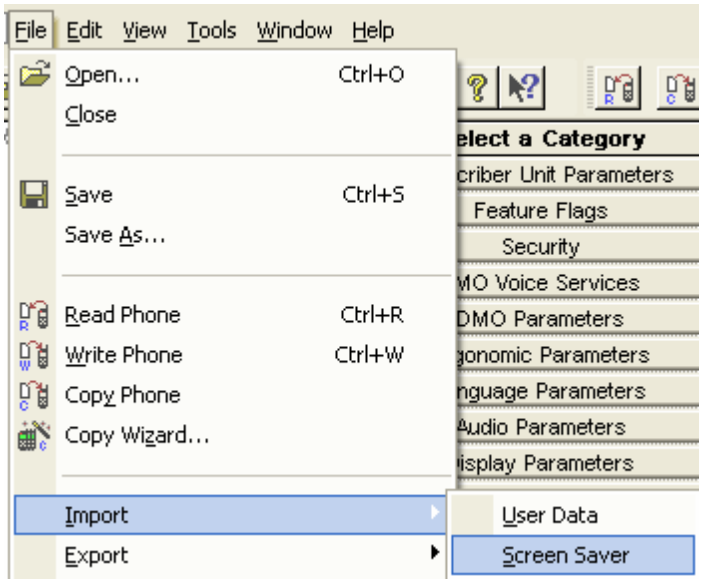


CAUTION: Never disconnect the programming cable from the terminal during the programming process, or power off the PC while the codeplug file is in memory. This will cause codeplug data to be corrupted.

1. Read the master codeplug from the master terminal, or open the master codeplug file from archive.
2. Select File/Copy Wizard. The first Copy Wizard dialogue box will be displayed.
3. Click the appropriate check box to select the items to be copied, or click Select All option.
4. Select the 'Power Off' option, this will automatically reset the terminal after copying.
5. The CPS will automatically search for the connected terminals and will display the connect operation results. Check the connection results and click Ok to start the cloning. The CPS will show the progress of this task per connected serial port(s).

   Note: If task progress is not shown or an error occurs, go through the checklist in Unable to Copy Phone.
6. When the process is complete, click Done to exit the Copy Wizard.

4.9 Import Menu



Note: This option is only available if the 'Administrator' password has been used to open the CPS and has the following two options:

4.9.1 Import User Data

This option is used to import data from a user data file into the active or current codeplug file and importing user data into a codeplug will REPLACE the existing entries.

In the Open User Data dialogue box, select the desired file name and click OK. The application will place the user data in the appropriate fields (for example, phone list entries will appear in the Phone List table).

When reading a user data file, the application will ignore entries and lists that are not valid for the active phone mode.

To prevent a CPS crash, **Do Not** use question marks in the alias/name fields of any file.

Note: To create a user data file, open the codeplug file from which to copy the desired data. Then use the Export User Data function to create the file.

Note: Use the Export and Import User Data functions to download data to several phones i.e. call list data.

4.9.2 Screen Saver

This feature is not supported for the terminal model MTM800 Enhanced.

4.10 Export Menu

Note: These 3 options are only available if the 'Administrator' password has been used to open the CPS:

4.10.1 User Data

This option is used to save user data to a file by bringing up the Save dialogue box.

Select the types of data to be saved and click the Save button. If no types are selected, the save button is disabled and the file will not be saved, otherwise specify the desired file name, hard drive and directory location and click OK.

Notes:

- Make sure the call lists have entries in them before exporting the data. Otherwise, the user data file will be empty.
- If a user extension is not provide to the file name, the application will automatically add this file name extension when it saves the file.
- Use the Export and Import User Data functions when several terminals are required to have the same Call List data.

4.10.2 User Report

This is used to generate a customised user report of codeplug data. The customised report is saved as an *.html file.

4.10.3 Screen Saver

This feature is not supported for the terminal model MTM800 Enhanced.

4.11 Change Codeplug Password

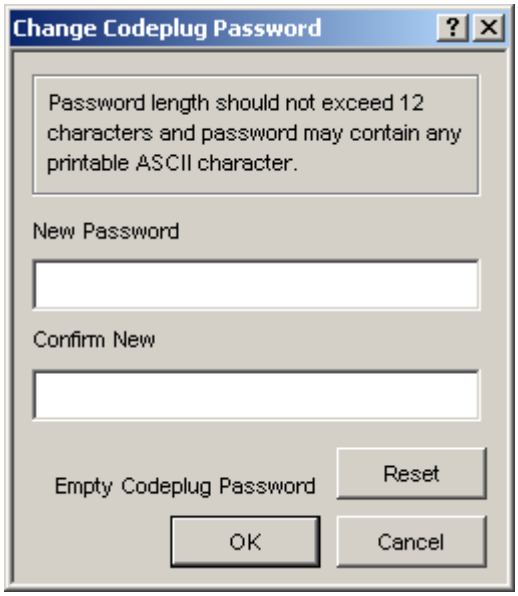
If the codeplug is protected by a password, this menu enables the codeplug password to be changed.

To prevent an unauthorised user from viewing or editing the codeplug file, it can be protected with a password.

To set a codeplug file password:

1. If there is more than one open codeplug file, make the required codeplug file active by clicking on its title bar.
2. Select File/Change Codeplug Password. The following screen will pop up. Enter the pass-

word (case sensitive), re-confirm, and click OK. Keep the codeplug password in a safe place.



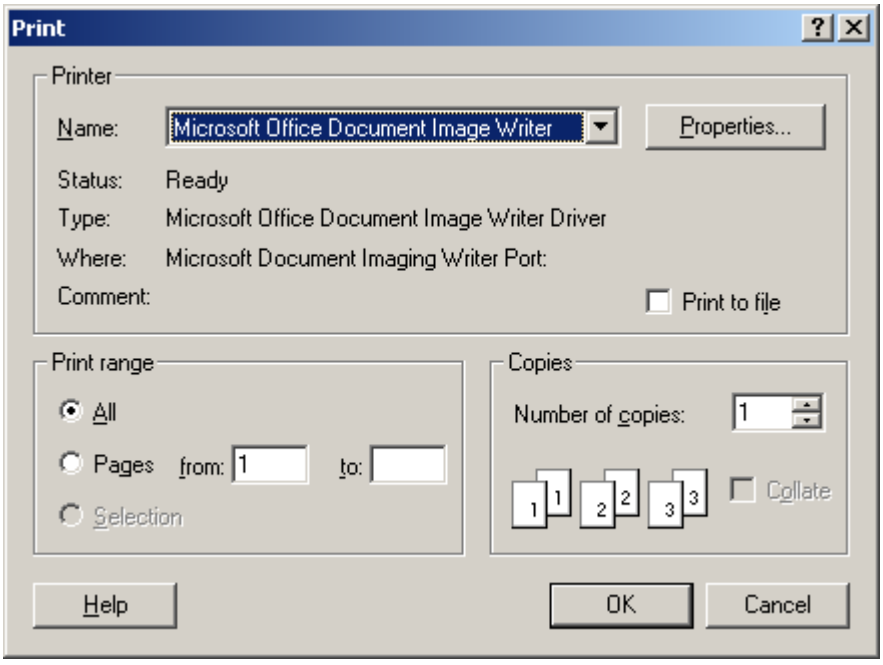
Follow the same procedure to change a password.

To remove the codeplug password, click Reset. All settings will be saved during write/save operations.

If the codeplug is not password protected, but “Protect Codeplug Saving” check box is enabled in Tools/Options/General, the CPS will ask the user to protect the codeplug for Save, Save As, and Write codeplug tasks.

4.12 Print

Selecting this option will display the standard Windows® print screen and is used for making a paper copy of the code plug.



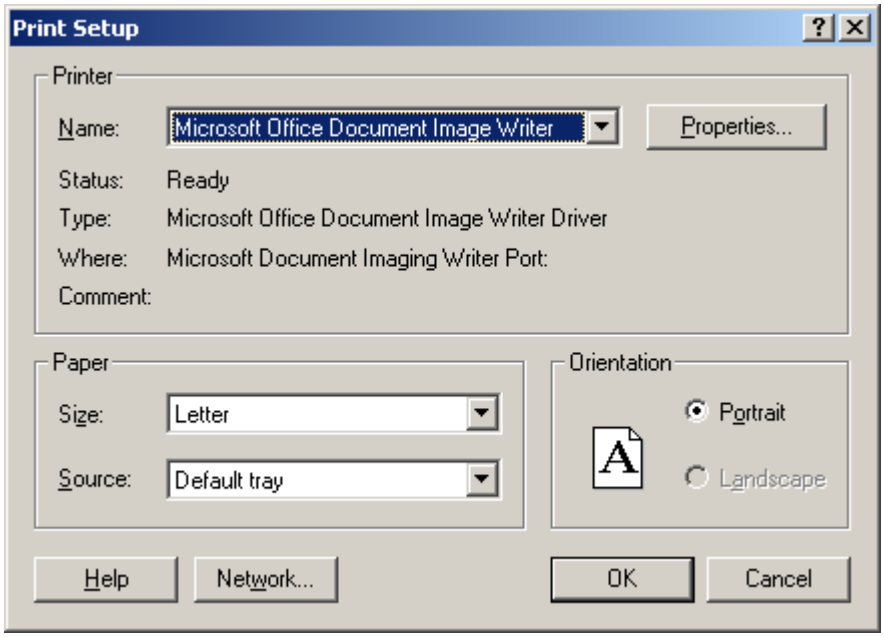
4.13 Print Preview

	Field Name	Field Value	Reset
1	Originating PPC Private Call	☒	
2	Call Priority for Outgoing Private PPC PTP	14	
3	PPC PTPC Priority 12 13	Accept	
4	Scan Group Priority Behaviour	Interior Priority	
5	Audio Shock Delay Timer msec	3000	Reset

This displays the options of the selected menu that will be printed.

4.14 Print Setup

Selecting this option displays the ‘Standard’ PC print screen option window used for setting the printer parameters.



4.15 Send

Microsoft Outlook® must be installed in the user’s computer.

This option allows the user to send an E-mail containing, as an attachment, the Codeplug from the current window.

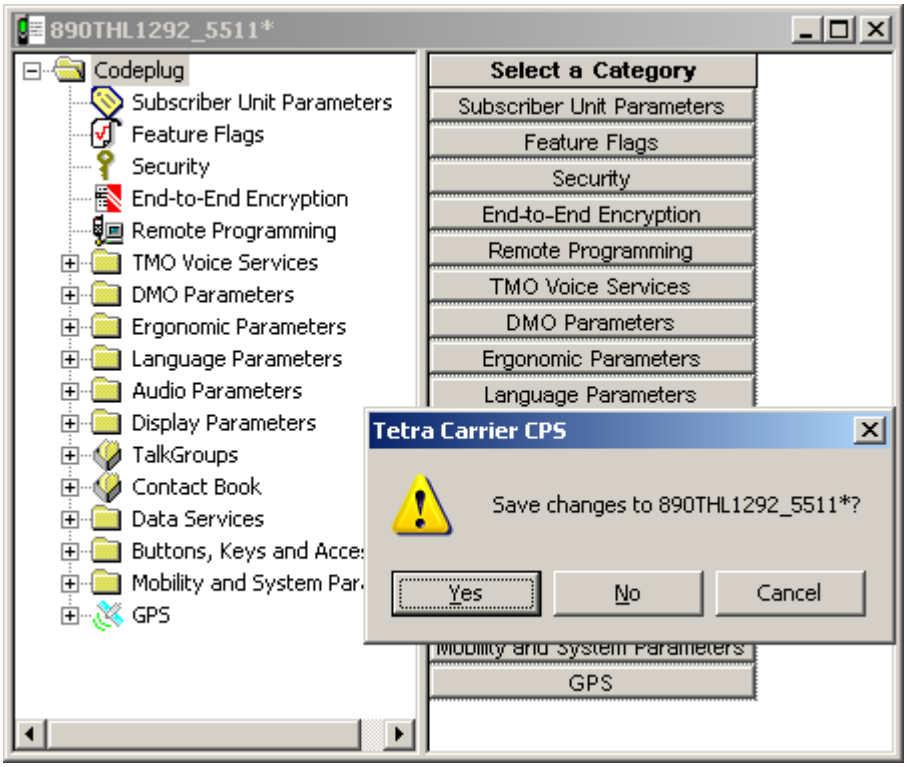
The standard Microsoft Outlook® message screen will appear. The message title and the Subject field will display the name of the Codeplug file from the active window. The Codeplug file itself will be attached to the message. Type the name of the message recipient in the ‘To Field’ and press the Send button. The message will be sent to the recipient and the message screen will disappear.

Un-Named Option. Between the Print Setup and Exit options is a further option that may not contain any information. It will display all the code plug identities of the code plugs that have been opened/read during the current CPS session.

If these code plugs have been stored and closed, selecting a displayed code plug identity will re-open the code plug.

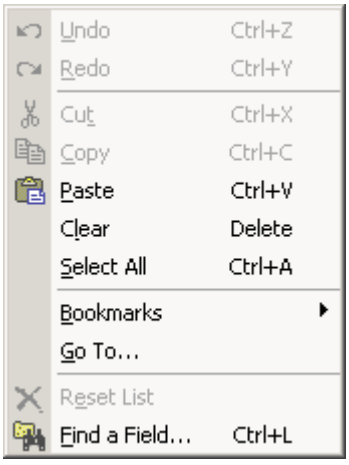
4.16 Exit

Selecting this option will close the CPS. if a codeplug is displayed in the work box and has been edited, the user is given the following three options:



5 Edit Menu

This menu is only available after a codeplug has been read.

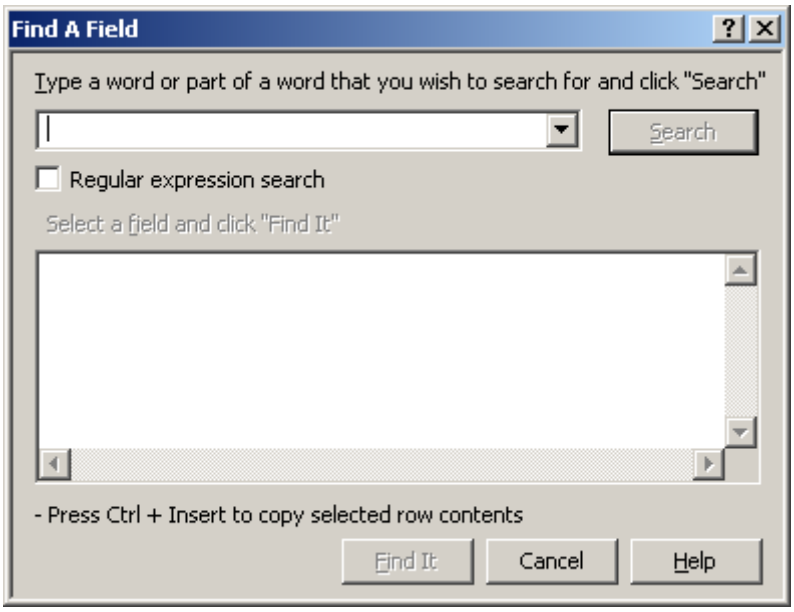


The available sub menu options are self explanatory and most will remain ‘greyed out’ until a codeplug has been opened and a sub menu or an option of a sub menu has been opened.

5.1 Find A Field

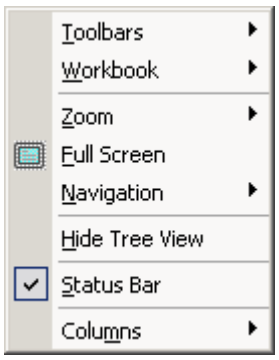
This option is used to find a field in the application.

Its selection brings up the Find a Field dialogue box where the user is prompted to type a search keyword. The application will display a list of fields whose names contain the search keyword. Select the required field name and the code plug will open at the correct menu with the selected field displayed in the right hand editing window.



6 View Menu

This contains several options for customisation of the layout of the displayed CPS windows.



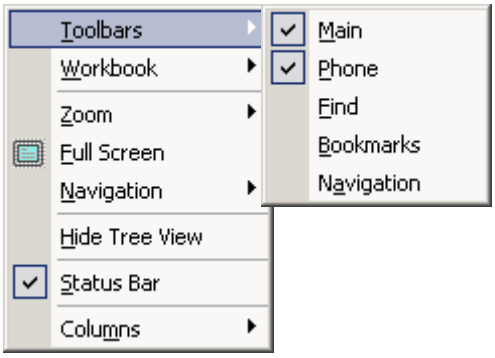
The available sub menus are:

- Tool Bars
- Work Book

- Zoom
- Full Screen
- Navigation
- Hide Tree View
- Status Bar
- Columns

6.1 Tool Bars

This is used to toggle the displayed toolbars on or off. The toolbars are located below the menu bar. They provide easy access to frequently used functions such as opening and saving codeplug files, editing call list data, and copying data the phone.



The available options are:

- Main
- Phone
- Find
- Bookmarks
- Navigation

6.1.1 Main

This is used to toggle the Main toolbar display on or off. This toolbar provides easy access, by icon selection, to standard functions such as save file, open file, print file, cut, copy, and paste.

6.1.2 Phone

This is used to toggle the Phone toolbar display on or off. This toolbar provides easy access by icon selection to phone-related functions such as Read Phone and Copy Phone.

6.1.3 Find

This is used to find specific text within the application.

The binocular icons are used for selection purposes. To display an icon's function, place the pointer over the icon.

6.1.4 Bookmarks

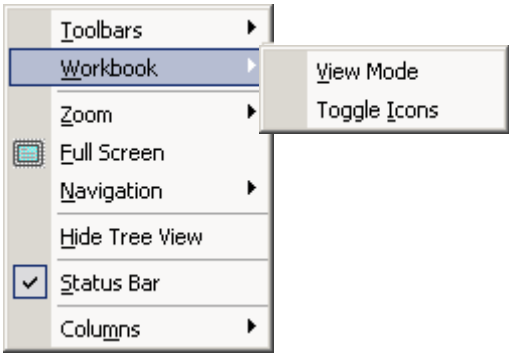
This is used to display the Book Mark icon options on the tool bar.

6.1.5 Navigation

This is used to display the Forward, Previous, Next and Back navigation buttons on the tool bar.

6.2 Work Book

The workbook is located at the bottom of the document window and displays the name of the open codeplug file and can be toggled on/off.



The Work Book menu has the following 2 options:

- View Mode
- Toggle Icons

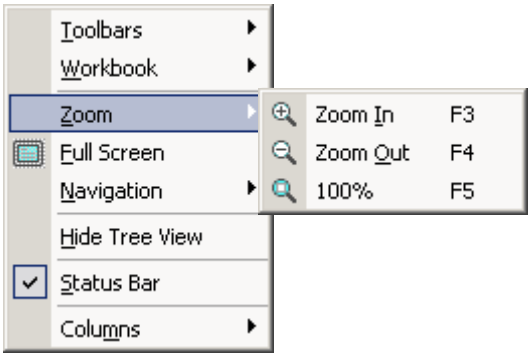
6.2.1 View Mode

Selecting this option will display a terminal's serial number at the bottom left of the window and is used in conjunction with the Toggle Icons option.

6.2.2 Toggle Icons

This option is used with the View Mode option. If multiple codeplugs are on the work screen the user is able to toggle between codeplugs by simply selecting the required codeplug from the bottom of the screen.

6.3 Zoom

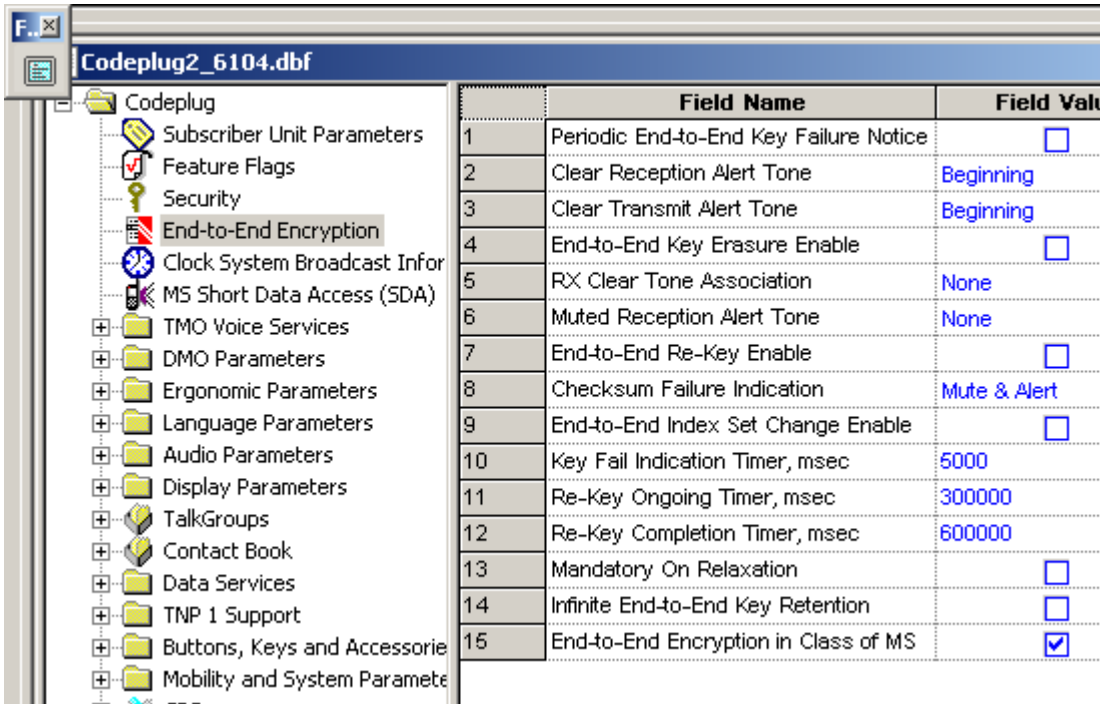


It is possible to change the magnification level of a codeplug file page and the minimum and maximum zoom levels depend on the open page size.

Choosing the 100% option will make the codeplug file fill the work screen

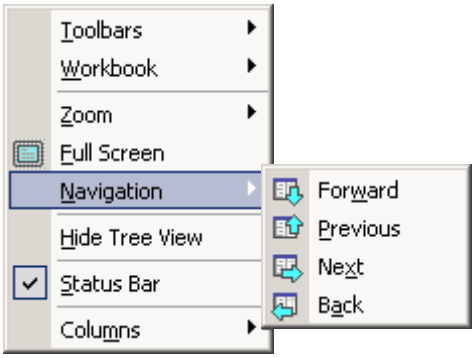
6.4 Full Screen

Selecting this option will fill the PC screen with the CPS work area. Select either the Esc key to return to the normal view, or select the icon option displayed in the top left corner of the screen.



6.5 Navigation

.



It is possible to navigate through the codeplug tree using Forward, Previous, Next and Back options.

6.6 Hide Tree View

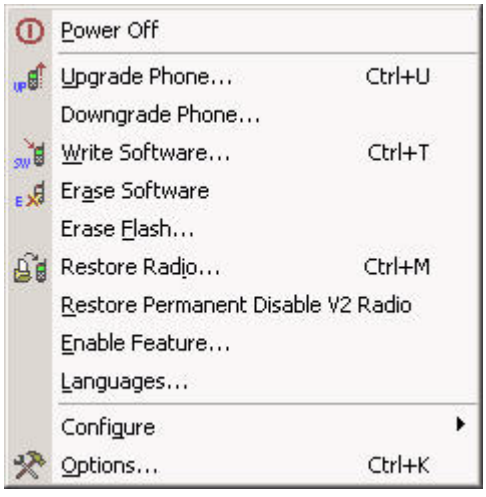
This option is used to toggle the tree view on or off.

6.7 Status Bar

This option is used to toggle the status bar display on or off. The status bar is located at the bottom of the work window and displays information about a command, toolbar button or an operation in progress.

7 Tools Menu (Administrator Login)

The following options/sub menus are available when the CPS is opened using the administrative login.



These options enable a terminal to be updated with the latest software release and code and also may enable a terminal to be recovered if a codeplug is inadvertently upgraded when the terminal is read using a later edition of CPS.

7.1 Power Off

After upgrading the terminal's codeplug operation, select this option to power down the terminal and take it out of the programming 'Flash Mode'.

It is also possible to restore the terminal's to its normal mode of operation by disconnecting the terminal from the programming cable, removing and then replacing the battery.

Either way will take the terminal out of the 'Flash Mode' that is required for CPS programming.

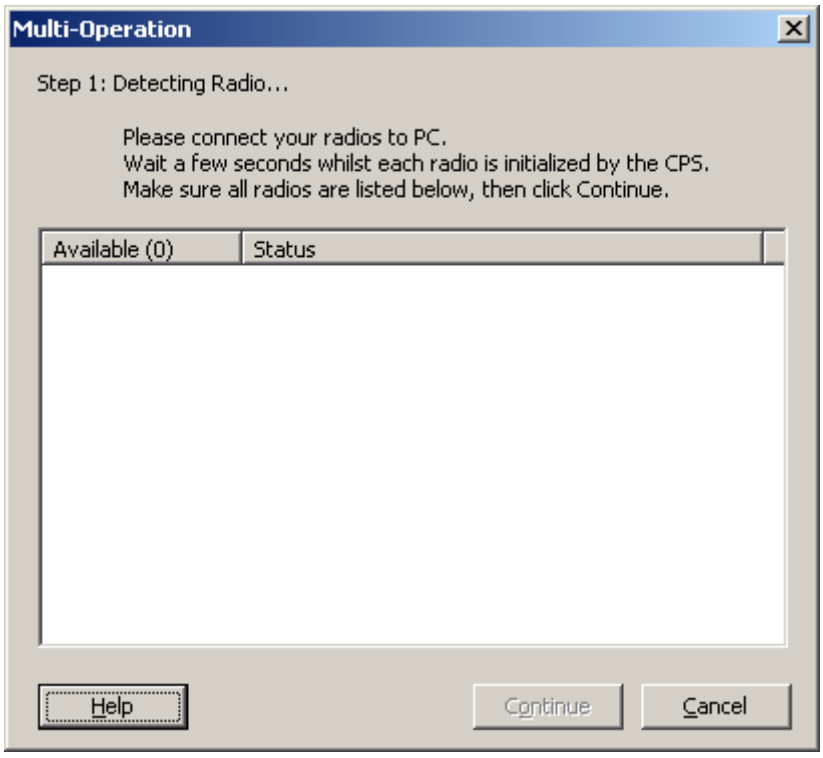
The Power Off option is recommended when programming as the terminal will be restored to normal operation without having to remove the battery.

7.2 Upgrade Phone

This option is used to upgrade one, or several terminals simultaneously (up to 8 per computer).

It is possible to activate this operation by selecting either the "Upgrade Phone" option in the Tools menu, or use the shortcut Ctrl+U.

CAUTION: Do not disconnect the programming cable from the phone during the write operation. This will destroy your terminal.



In the Options dialogue box, make sure the default software path is set to the directory that contains the subscriber software files. Connect the phone(s) you need to upgrade.

1. Select Tools/Upgrade Phone. The Upgrade Phone function will search for the connected phone(s) automatically and will display the connect operation results. Check the connection results and click Continue to enter the Upgrade Phone dialogue.

2. In the Upgrade dialogue check the Power Off box to turn off the phone automatically after the upgrade operation. Check the subscriber version and the data codeplug to write in the Upgrade Data area for each port's page. To start the upgrade operation, click Write. The CPS will show the progress of this task.

3. Operation results for each detected phone will be displayed in Upgrade Result area of the Upgrade Phone dialogue.

4. If the upgrade operation fails at the Write Data To Terminal stage, click Retry to retry writing the same data to the same terminal. (The Retry button appears in the Upgrade Phone dialogue in case of failed upgrade.) If multiple upgrade is performed and failure occurs only for some of the upgraded terminals, the Retry operation will be performed only on these terminals. If the terminal was disconnected and reconnected again during upgrade, the Retry operation will not be performed and you will be warned that the communication session id does not match.

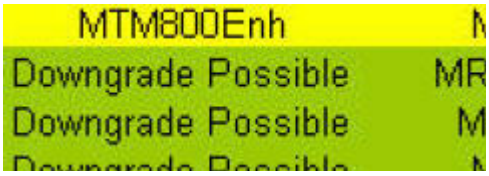
5. If you have chosen to turn off the phone manually after upgrading, select Tools/Power Off to return the phone to normal mode of operation. Another way of returning the phone to normal mode of operation is to disconnect it from the programming cable, and remove and then reinstall the battery.

7.3 Downgrade Phone

You can decline the downgrade of some attached terminal(s) that are presented in the dialog box in the appropriate tab(s). The header of each tab includes a check box. If a check box is unselected, the CPS does not downgrade the radio connected to the appropriate port.

The CPS determines software type of the attached terminal via **Application Image** field located in the **Subscriber Unit Parameters** feature of the radio codeplug. This field indicates which software - clear or TEA1/TEA2/TEA3 encrypted - is written in the radio. The downgrade dialog box displays the list of software versions, which the radio can be downgraded to.

A downgrade matrix is used to restrict the software that can be used to downgrade radio which has a higher version SW and codeplug:



CAUTION: Do not disconnect the programming cable from the terminal during the write operation. This will destroy your radio.

7.4 Write Software

This option is used to write (or flash) software to the phone.

CAUTION: Do not disconnect the programming cable from the phone during the write operation. This will destroy your terminal.

Note: The CPS will display only those fields that are applicable to the CPS programming level.

7.5 Erase Software

This option is used Erase Software.

1. Open the Tools menu and click on the Erase Software function.
2. The CPS starts reading the codeplug file from the phone. (Click the Cancel button here to interrupt the Read and Erase Software operations.)
3. The CPS continues the Erase Software operation till successful completion.

7.6 Restore Radio

The CPS is able to restore the attached terminal if its codeplug has been saved as backup file if the Write Software function or Upgrade by Software operation failed.

Required inputs are:

- Attached terminal
- Backup codeplug file.

Processing

1. Launch this function either from the Menu bar, or by using the keyboard shortcut (Ctrl+D).
2. The CPS will read the codeplug from the attached terminal and determine its Serial Number.
3. The reading in progress will be displayed. It is possible to cancelling the read operation.
4. The CPS will look for the backup codeplug file according to the Radio Serial Number, at the path indicated in the Default Backup Path field in the Directories Options dialogue box.
5. When the backup codeplug file is found, the CPS will read the name of the Software file from the Application Image<Application_Image>fieldhlp field of the codeplug, and the user prompt will ask for confirmation to write the codeplug and software to the terminal, or cancel the operation.
6. If confirmed, the Restore Radio function will proceed in the following order:
   - The software application will be written
   - Then the codeplug is written.

   The writing progress for both the software and codeplug will be displayed on screen.
7. An appropriate message will be displayed, notifying the success or failure of this operation.

Note: If the backup file does not exist in the Backup directory, or if the software application file has not been found in the SW directory, then an error message will be displayed to indicate the problem and the operation will be aborted. The operation will also be impossible if the ‘Application Image’ field of the codeplug is empty.

Outputs

Restored terminal.

7.7 Languages

Determines which languages are enabled in the terminal.

Note: The CPS will display only those codeplug blocks and programming options that are applicable to the active phone model.

The **Default Software Path** must point to a folder containing the z19 files containing language information. Refer to Paragraph 7.8.4.4 "Directories"

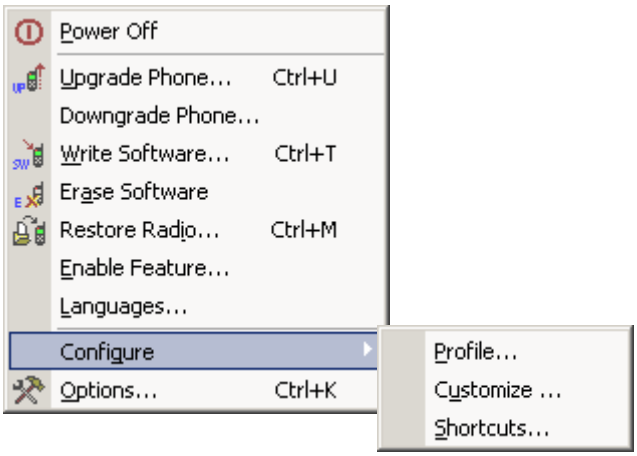
One of 2 options can be selected:

- English, European Koran Greek Arabic
- English, Chinese

Press Write button. Selected software will be flashed to terminal. All software packs that existed on the terminal before will be over written, except for local language pack. This pack will remain in terminal.

7.8 Configure

This menu enables the computer preferences to be set.



7.8.1 Profile

This is a customer application for the customisation of the tool bars and is only cosmetic.

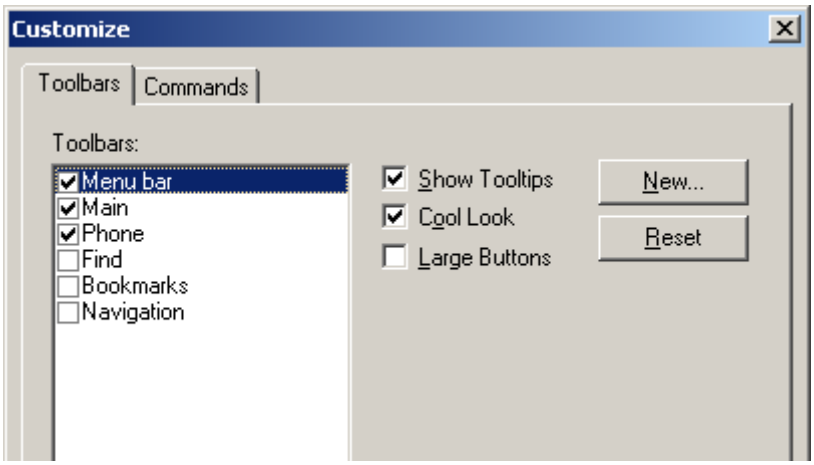
7.8.2 Customize

This option is used to set the default appearance of the CPS tool so that it will always open to the user requirements.

It has the following two options:

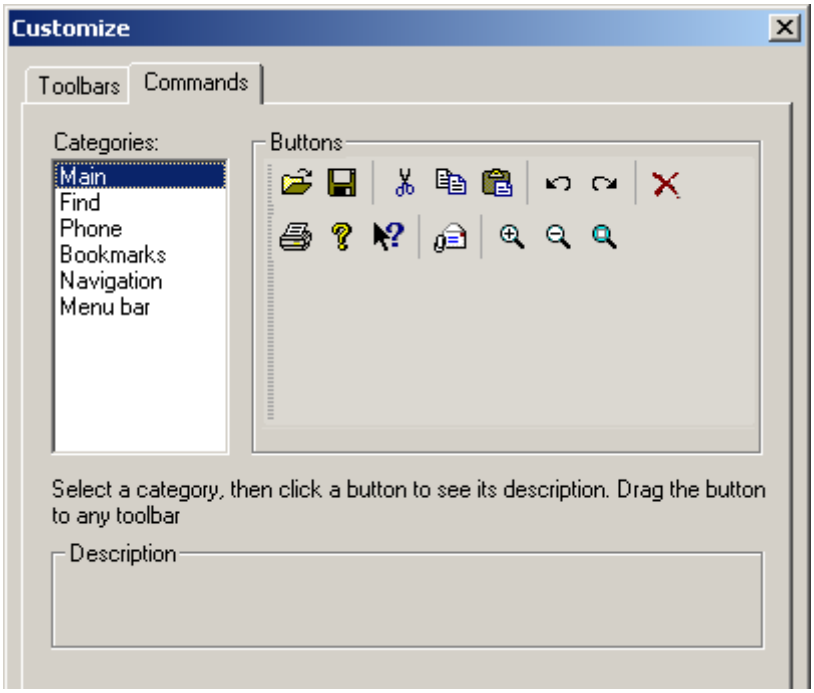
7.8.2.1 Toolbars

This sets the viewed Icons and Tool Bars for display. .



7.8.2.2 Commands

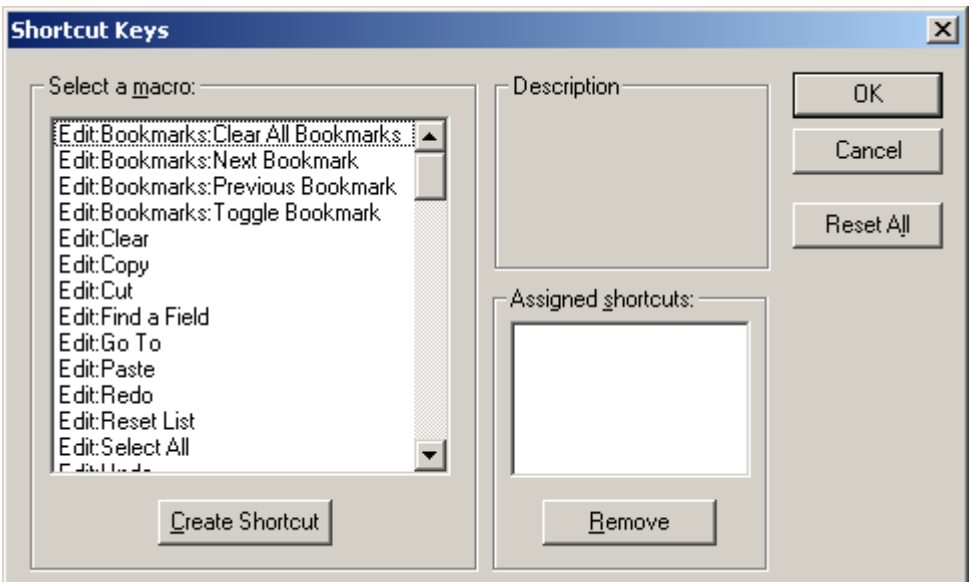
Choose a category to show its available buttons, select the required button and drag it onto a toolbar.



7.8.3 Short Cut

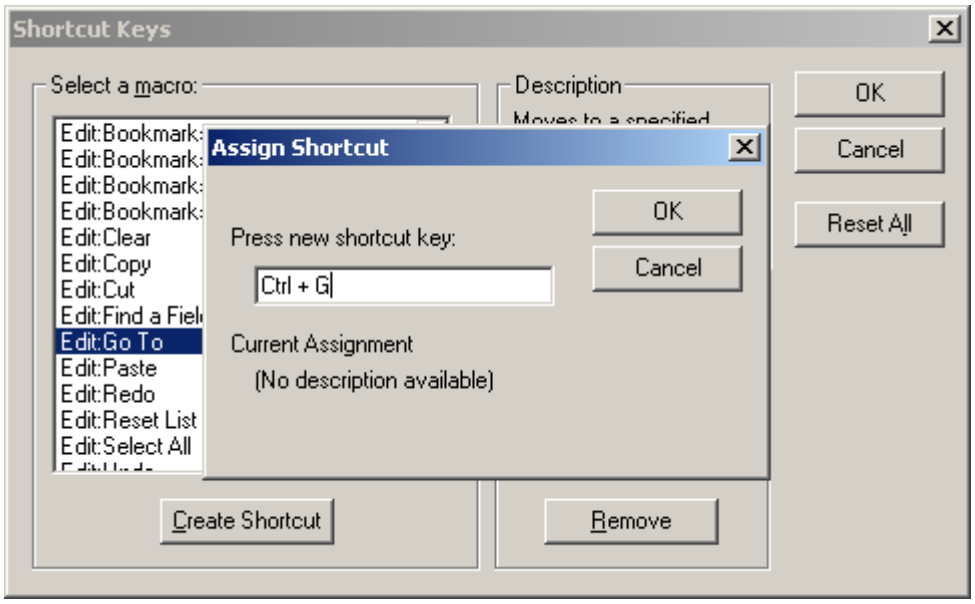
This option is used to create computer keypad short cuts for the CPS.

I.e. Ctrl + P = Print.



Selecting this option will display the above box

From the “Select a macro” list chose the desired operation for shortcut creation, click the Create Shortcut button and the Assigned Shortcuts message box appears. Then assign new shortcuts, using such functional keys as Ctrl and Alt, plus any other key, including a numeric one. A warning prompt will appear if the shortcut already exists for that operation.



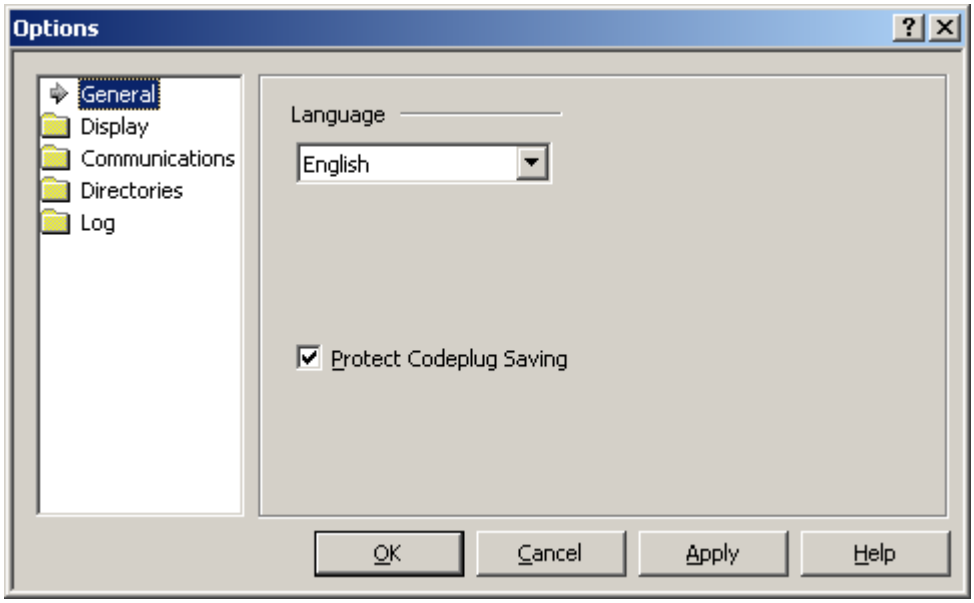
7.8.4 Options

This menu is used to define the appearance, communication port and speed, the default directories and logging of the CPS.

It has the following sub-menus:

- General
- Display
- Communications
- Directories
- Log

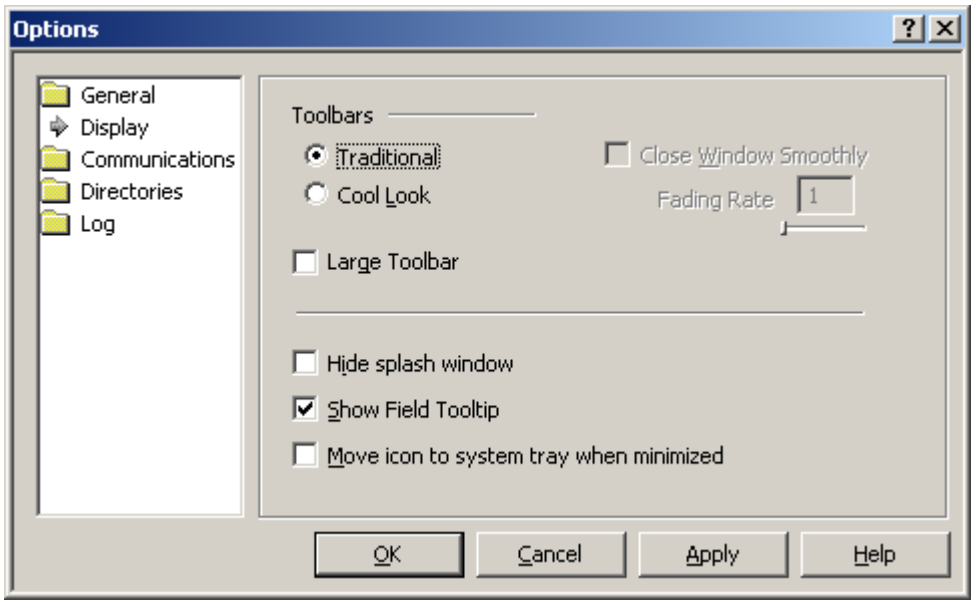
7.8.4.1 General



This submenu is used to select the working language of the CPS and it has the following options:

- English
- Chinese (Simplified)
- Chinese (Traditional)
- Hungarian
- Korean
- German
- Italian

7.8.4.2 Display

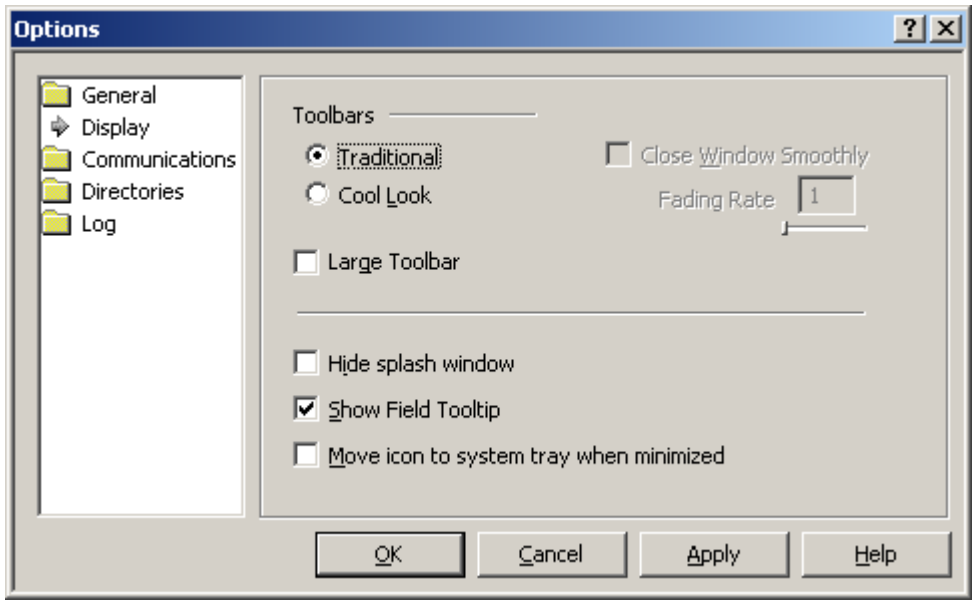


These options allow:

1. Switching between “Cool” interface and “Traditional” interface as well as offering some additional options for each one:
   - Cool interface: the toolbar buttons are flat and pop into an etched state as you move the cursor over them. It contains grippers to facilitate moving and docking.
   - Traditional interface: the toolbar buttons are raised.
2. Setting the toolbar size.

Selecting one of the available four language options.

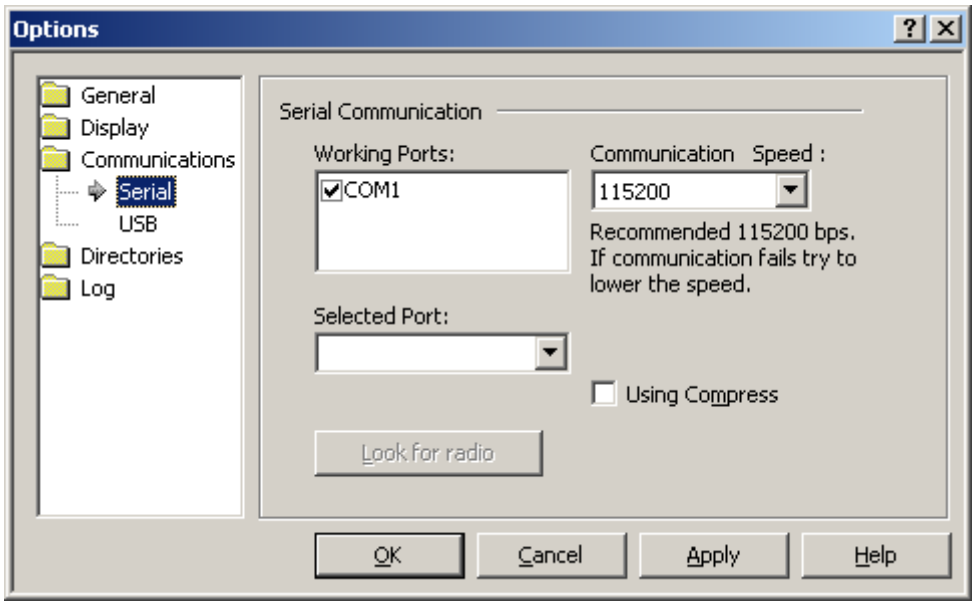
7.8.4.3 Communication



Enables the serial ports to be used in CPS-to-phone communication.

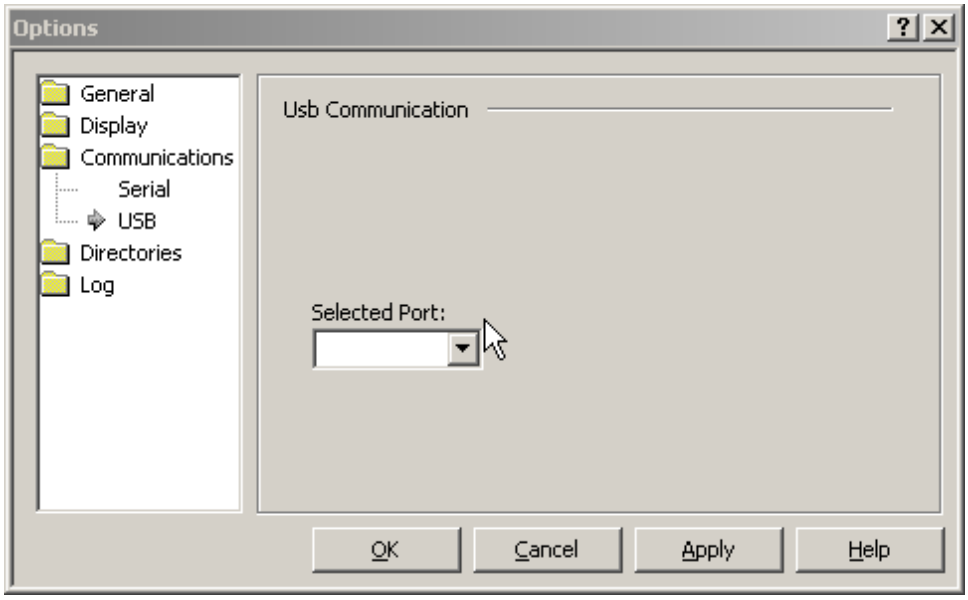
To define the working port and the communication speed, use the pointer and select the down arrows of the option windows and drag the pointer down to the desired value.

Serial Port selection options.



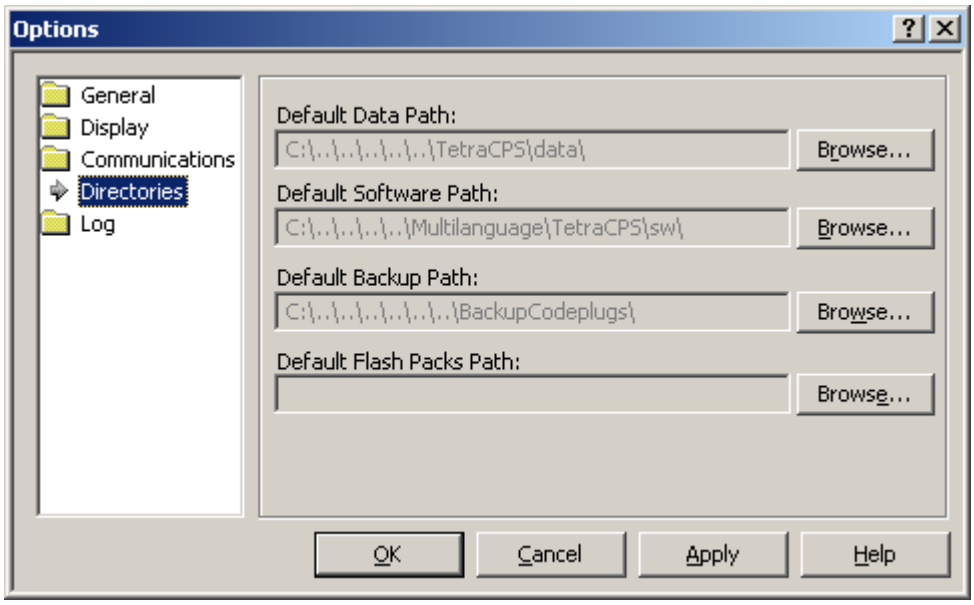
Note: Refer to your computer User Manual for a complete description of serial and parallel ports

USB Port selection options.



Note: Refer to your computer User Manual for a complete description of USB ports

7.8.4.4 Directories



This is used to specify the default paths of the directories for codeplug, software and backup files.

Note: If there are several versions of Tetra CPS installed on the PC, these paths **MUST** be configured as soon as the CPS is first launched, as the paths may default to existing directories.

This page lists three fields displaying the last selected path:

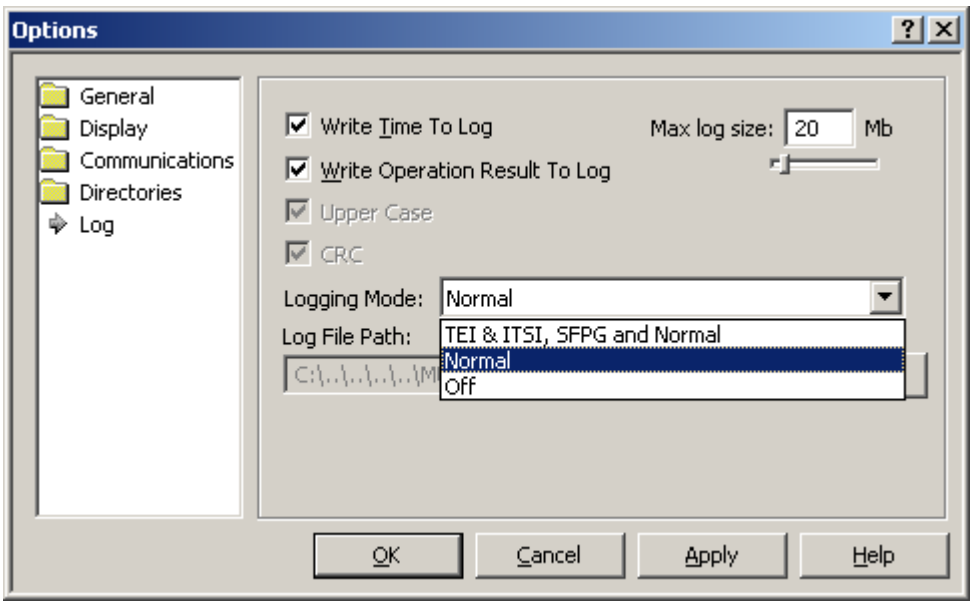
- **Default Data Path** — specifies the default path to the drive and folder (or directory) where the codeplug file is located.
- **Default Software Path** — specifies the default path to the drive and folder (or directory) where the subscriber (flashing) software is located.
- **Default Backup Path** — specifies the default path to the drive and folder (or directory) where the codeplug backup files are located.
- **Default Flash Packs Path** — specifies the default path to the drive and folder (or directory) where the Flash Packs files are located.

Each field has its accompanying Browse button.

Click any Browse button to bring up the Browse dialogue box, open the drivers/folders and select the path to the directory where the desired file(s) will be stored/located.

To confirm the selection press OK. The path will be displayed in the relevant field of the Directories page.

7.8.4.5 Log



Logging Options

Allows the logging feature to be enable/disable and to set up options for the Log file.

To enable the logging, from Logging Mode drop down list select Normal or TEI & ITSI, SFPG and Normal. To disable the logging, from Logging Mode drop down list select Off.

Enable logging:

If logging is enabled, the CPS will write to the log file basic statistical information such as data, time, operation name, operation data and operation result for main CPS functions activated by user during CPS sessions.

When launched, the CPS will check whether the Log file exists or not in the directory, which is specified in the Log file path field.

If the file does not exist, the CPS will automatically create it with the name cps_user.log.

An already existing log file will be appended to the newly recorded information.

Logging Mode:

Position the cursor into the combo box, then drag it to the required mode for the log file:

- TEI & ITSI, SFPG and Normal
- Normal
- Off

If the **Normal** or **TEI & ITSI, SFPG and Normal** modes are selected, the CPS checks whether or not the log file exists in the directory specified in the Log File Path field. If the file does not exist, the CPS creates it with the name cps_user.log. If the log file exists, new information will be recorded into it.

If the **Off** mode is selected, the logging of all operations will be disabled. If the log file already exists, no operation will be recorded into it.

Normal. If the Normal mode is selected for communication operations through one port only, then the recording of all log operations through the default port will be written into the cps_user.log file.

The logging of all operations will be enabled and performed according to the other logging page settings.

TEI & ITSI, SFPG and Normal. If the ISSI & TEI Only mode is selected, then logging is similar to the one in Normal mode and the CPS will also log any operation (through all ports related to the TEI, ITSI and SFPG codeplug fields). The logging of all operations will be enabled and performed according to the other logging page settings.

Log Options:

The following two options will be enabled if the user turns on the proper check boxes:

- Write Time To Log
- Write Operation Result To Log file

If these options are enabled, the time of the function start and the operation result (pass or fail) will be appended to the new information recorded in the Log file.

Max log size:

This entry defines the maximum log file size. Click the slider to change the setting.The maximum size is 200 MB.

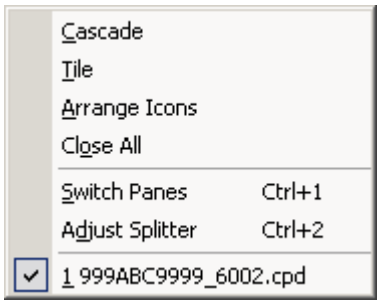
Over write Log Info as Needed: The "enabled" setting means that all new events will be written to the log, even when the log is full. When the log is full, each new event replaces the oldest one. The “disabled” setting means that existing events will be retained when the log is full. If the maximum log file size is reached, new events are discarded. This setting requires you to clear the log manually. Select this setting only if you must retain all events.

Log File Path:

The CPS allows a directory to be set up for the Log file location through the Browse dialogue box, which appears when clicking the Browse button. When the desired directory has been selected, click the OK button and the path to the directory will be written to the Log file path field in the Logging page. However, this path setting will be applied only in the next CPS session. Re-start the CPS if the Log file path has been changed in the current session.

See Paragraph 7.8.4.4 "Directories".

8 Window Menu



This menu is similar to that in other Windows® applications. From this menu, it is possible to access the following functions:

Note: This menu will be visible only if a file is already open in the application.

Note: The CPS will display only those functions that are applicable to the active phone model.

8.1 Cascade

Is used to arrange open applications so that they overlap and each title bar is seen. This option does not affect applications reduced to icons.

8.2 Tile

This option is used to arrange open applications into windows that do not overlap. It does not affect applications reduced to icons.

8.3 Arrange Icons

This is used to arrange the icons of all minimised applications across the bottom of the screen.

8.4 Close All

Selecting this option can be used to close all open file windows. This function is only available if two or more file windows are open in the application.

8.5 Switch Panes

This is used to switch the cursor from tree view to content view and vice-versa.

8.6 Adjust Splitter

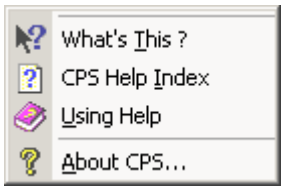
This is used to adjust the width of tree view and content view areas or the width of columns in the content view using the arrow keys on the keyboard.

Tip: This feature is useful when a mouse cannot be used (for example while programming a phone in the field).

8.7 1, 2, 3, 4 etc. (List of Open Codeplug Windows)

This is an alphabetical listing of all open documents which appears at the bottom of the Window menu. When selecting a document name, it will become the active document.

9 Help Menu



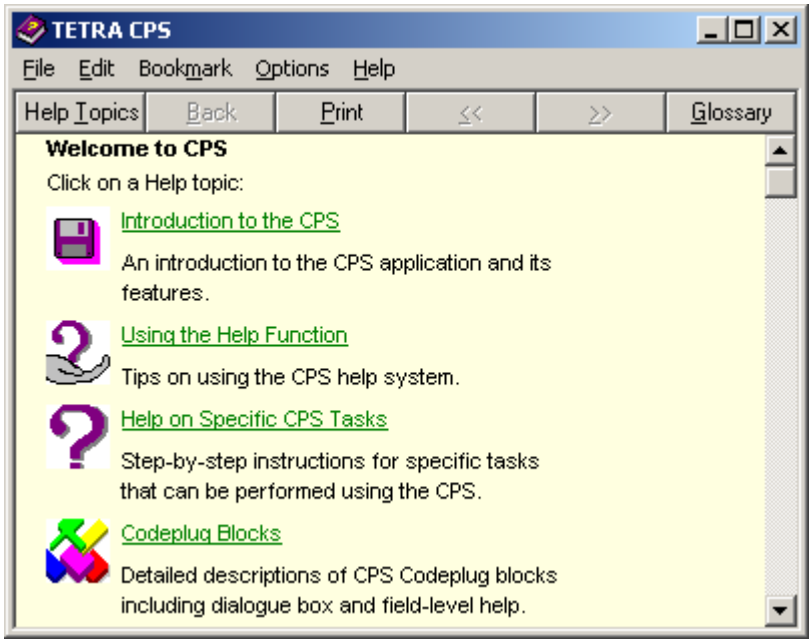
The Help Menu is similar to other Windows® based applications and has the following options:

9.1 What's This

Choosing this option selects the Question Mark/Arrow Tool which now becomes the cursor. Placing it over a field in the CPS and using the left mouse button to select the field, will display the associated help text

9.2 CPS Help Index

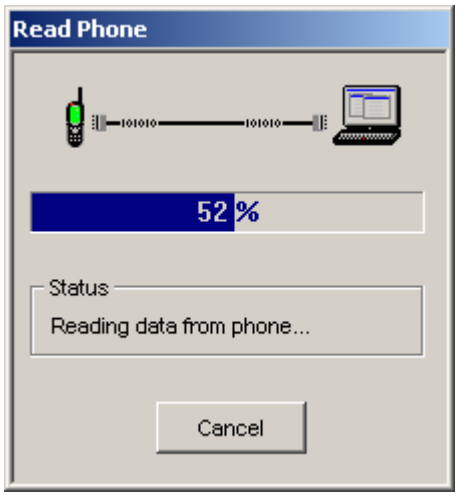
Selecting this menu item will open the CPS Help Index window. This window displays the available sub menus in a file card format which are self explanatory.



10 Reading/Opening a Codeplug

To read a terminal codeplug, connect the terminal to the active Com. Port via the appropriate programming lead for that terminal model (see chapter 1). Then either select the File menu and Read Phone option or click on the Read Phone icon, this is the first icon on the Phone Icon bar, also the others will be greyed out until a codeplug has been read.

Once selected the Read Phone Information box will be displayed. The CPS uses this box to update the user with progress reports, including failure.



If a file is to be opened from archive, either select the File Menu and the ‘Open Option’ or click on the open icon to display the Open Window dialogue box to select the file. Once selected the CPS will display a wait prompt as it loads the file into the Work Screen

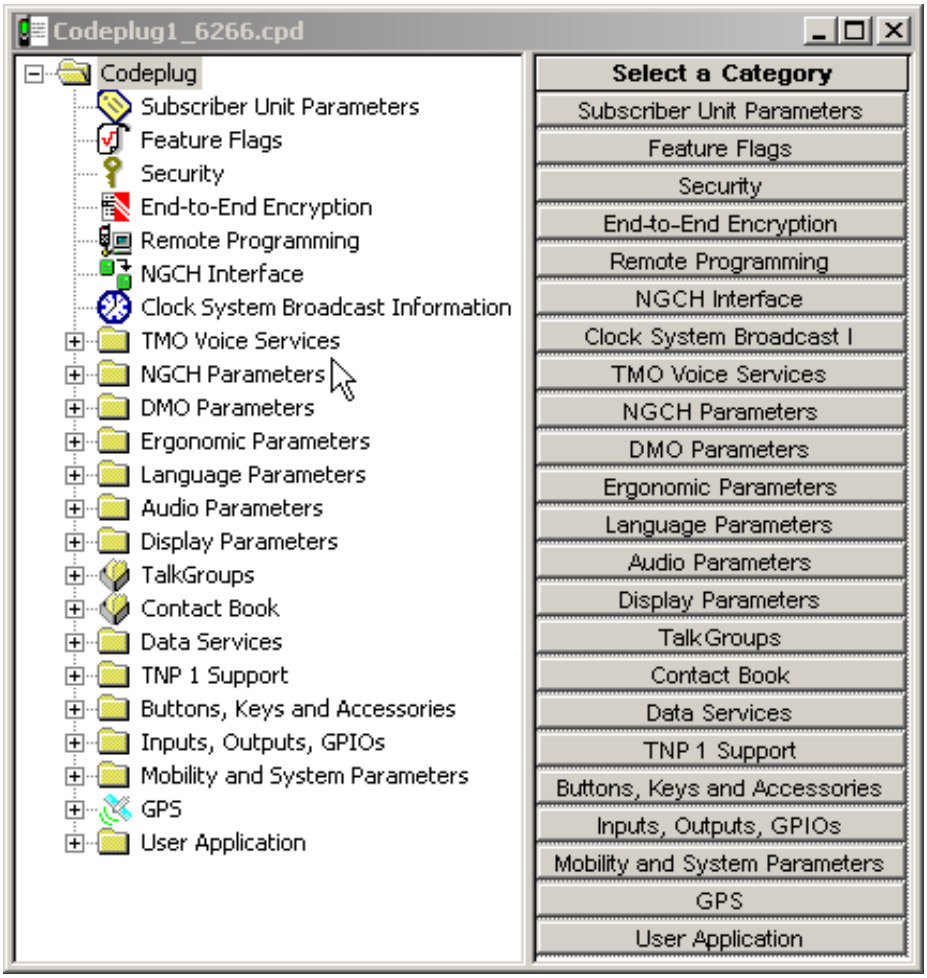
Once read, the codeplug will be displayed in the work screen for editing.

11 Phone Bar Icons

This bar, when selected, is displayed next to and on the same line as the main tool bar icons.

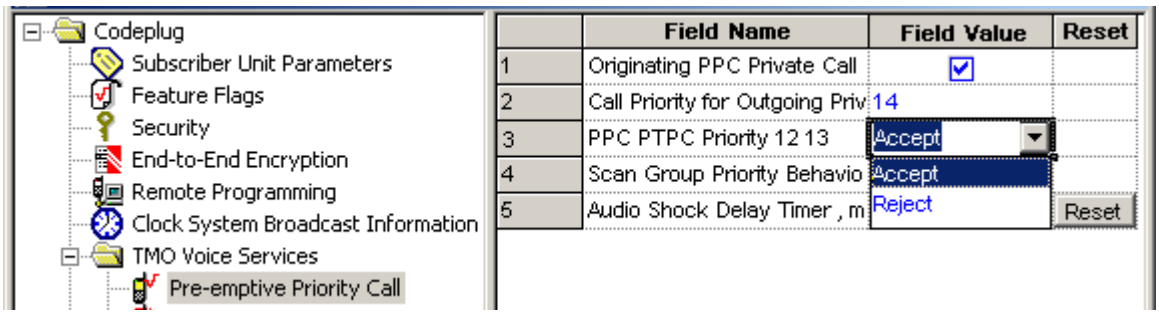
Placing the cursor over each icon will display its function, an explanation of which has previously been given. These icons are a short cut to the option they represent.

12 Codeplug



The top of the work screen will display terminal's identity, i.e. Codeplug5_6204.cpd

The main body of the work screen is divided into 2 parts, on the left are the main menus of the codeplug and on the right is the 'Select a Category' option. Once a menu has been selected the 'Select a Category' screen may change into 3 or more columns and may have the following options, Field Name, Field Value and Reset.



Note: Right clicking on the Field Value entry fields may display a 'Down Arrow' in the box. Select the arrow to display hidden options.

The following main menu options are available:

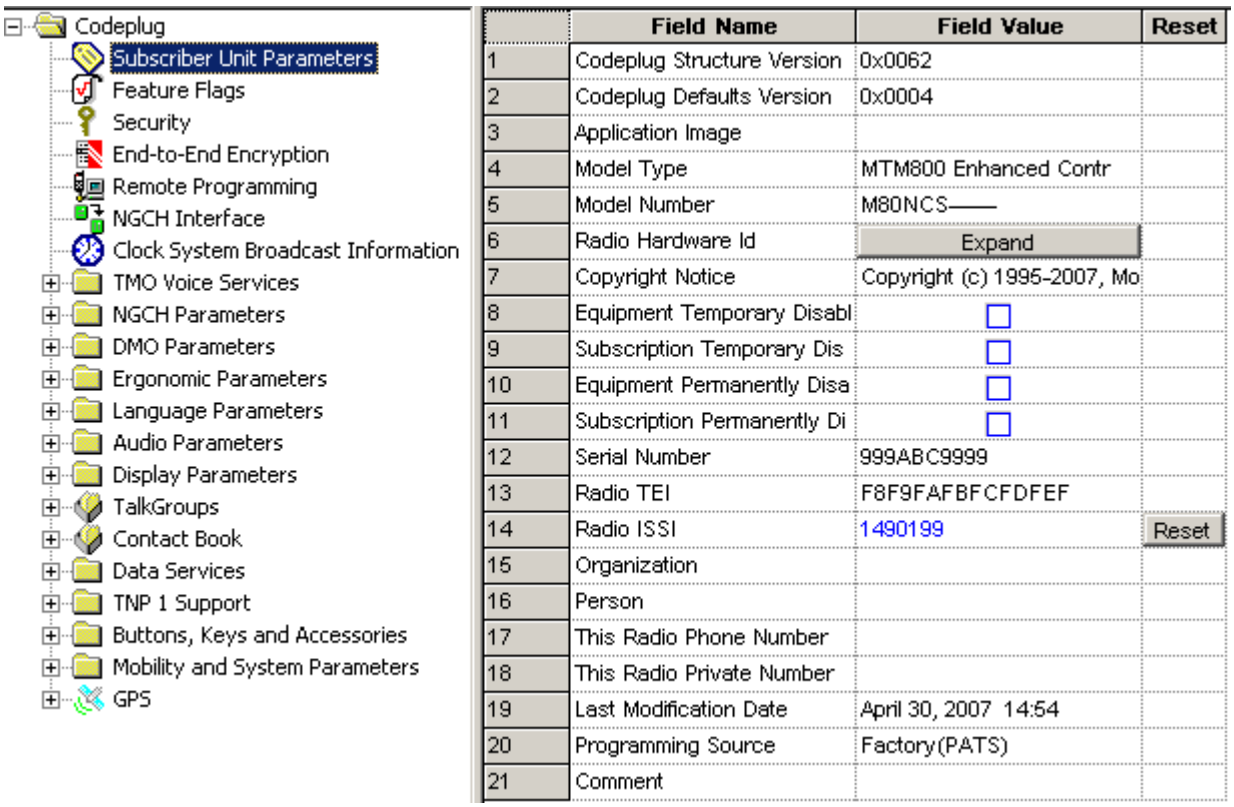
- Subscriber Unit Parameters
- Feature Flags
- Security
- End to End Encryption
- Remote Programming
- NGCH Interface
- Clock System Broadcast Information
- TMO Voice Services
- NGCH Parameters
- DMO Parameters
- Ergonomic Parameters
- Language Parameters
- Audio Parameters
- Display Parameters
- TalkGroups
- Contact Book
- Data Services
- TNP1 Support
- Buttons, Keys and Accessories
- Input, Output, GPIOs
- Mobility and System Parameters
- GPS
- User Applications
    - Call-Out

Note: When programming a terminal the minimum requirements to enable a terminal to log onto a system are:

- A valid identity (ISSI) for the terminal
- A valid Group identity (GSSI)
- Valid Country and System codes
- Valid frequencies

Everything else programmed into the terminal will make the terminal operation more flexible and friendly to the user.

13 Subscriber Unit Parameters



	Field Name	Field Value	Reset
1	Codeplug Structure Version	0x0062	
2	Codeplug Defaults Version	0x0004	
3	Application Image		
4	Model Type	MTM800 Enhanced Contr	
5	Model Number	M80NCS——	
6	Radio Hardware Id	Expand	
7	Copyright Notice	Copyright (c) 1995-2007, Mo	
8	Equipment Temporary Disabl	☐	
9	Subscription Temporary Dis	☐	
10	Equipment Permanently Disa	☐	
11	Subscription Permanently Di	☐	
12	Serial Number	999ABC9999	
13	Radio TEI	F8F9FAFBFCFDFEF	
14	Radio ISSI	1490199	Reset
15	Organization		
16	Person		
17	This Radio Phone Number		
18	This Radio Private Number		
19	Last Modification Date	April 30, 2007 14:54	
20	Programming Source	Factory(PATS)	
21	Comment		

Selecting this menu option will display its information in the right side of the screen. Not all fields are editable, some being information fields only.

The **first 6** fields provide information about the terminal's codeplug, software and application image versions, its model type, number and hardware ID.

Field 7 is a copyright notice.

Equipment Temporary Disabled is non-editable.

Subscription Temporary Disabled, is editable. When a terminal has been disabled over the air (stunned), this field will be 'checked'. It can be unchecked over the air or via the CPS. If the terminal is stunned it will no longer be usable on the system (TMO) or off the system (DMO).

Equipment Permanently Disabled and **Subscription Permanently Disabled**, are non editable

Serial Number show the terminal's serial number

Radio TEI show the terminal's Terminal Equipment Identity (TEI)

Radio ISSI.This is where the terminal's own Individual Short Subscriber Identity (ISSI) is entered. It is the terminal's unique system ID and it acts like a normal telephone number. The ISSI can contain numbers in the range 1 - 13999999. Without a valid ISSI the terminal will not log on to a system.

Organization. The name of the organisation where the terminal was programmed can be entered here for reference.

Person. The name of the person programming the terminal can be entered in this field.

This terminal Phone Number. Dependent upon the system telephone interconnect, it may be necessary for a subscriber terminal to have a separate telephone number and not use its ISSI. This field displays the subscriber phone number, it is also possible to view this number via the menu functionality. The subscriber can change the number without modifying the phone number in the system. Up to 24 digits can be entered.

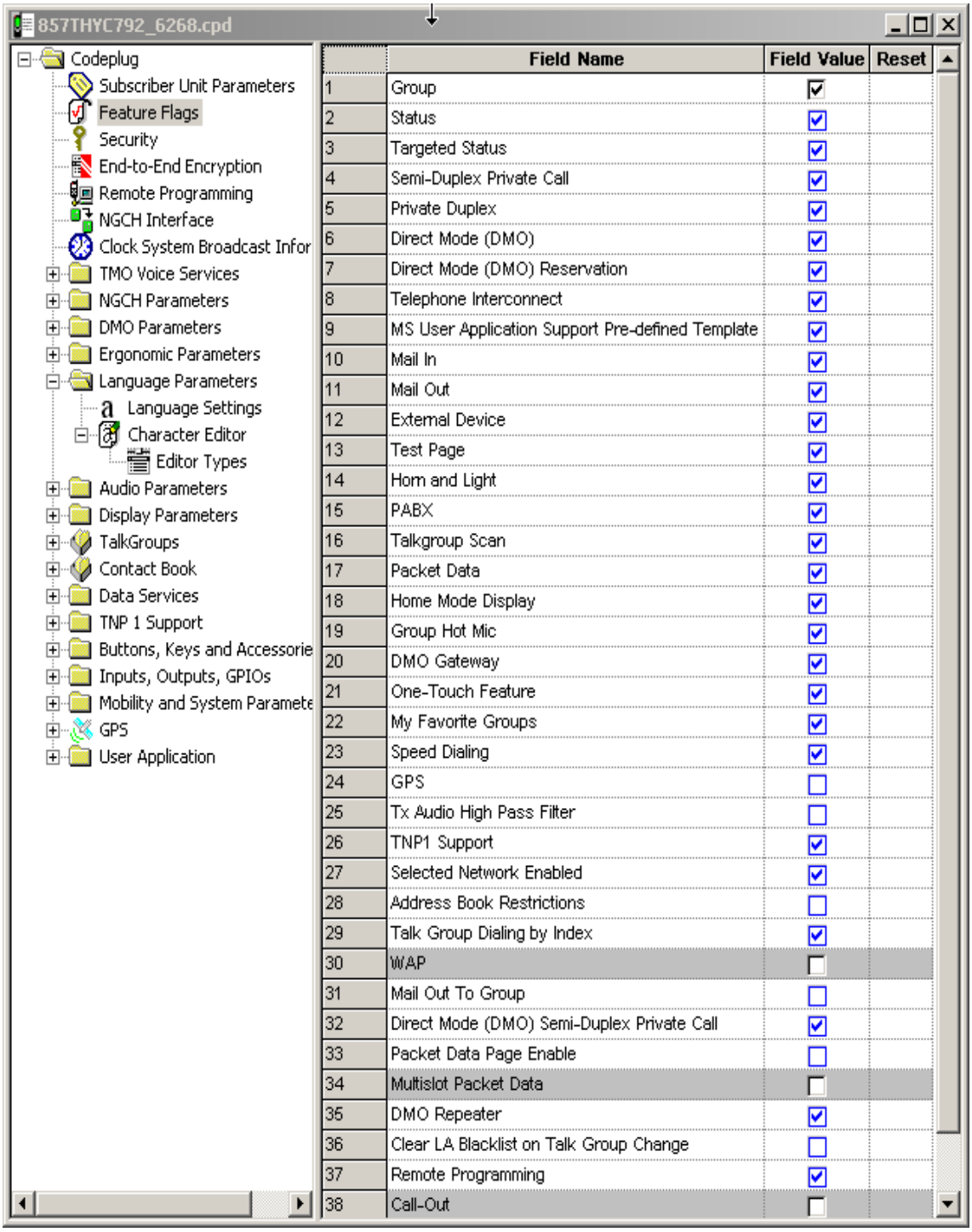
This Radio Private Number. Displays the subscriber private number. This is an 8 digit number that can be changed by the subscriber without modifying the phone number held in the system.

Last Modification Date. This non-editable field displays the date and time that the active Codeplug was last programmed. The CPS automatically updates this data every time the Codeplug is saved, or programmed into the terminal.

Programming Source. This non-editable field displays the source that was last used to program the active Codeplug. This may be: Factory, CPS, OTAP, or Other. The CPS automatically updates this data every time the Codeplug is saved or programmed into the terminal.

Comment. Comments can be entered about the last programming session and will be stored in the Codeplug. Enter the information, up to 59 characters, before writing the Codeplug to the terminal.

14 Feature Flags



	Field Name	Field Value	Reset
1	Group	☑	
2	Status	☑	
3	Targeted Status	☑	
4	Semi-Duplex Private Call	☑	
5	Private Duplex	☑	
6	Direct Mode (DMO)	☑	
7	Direct Mode (DMO) Reservation	☑	
8	Telephone Interconnect	☑	
9	MS User Application Support Pre-defined Template	☑	
10	Mail In	☑	
11	Mail Out	☑	
12	External Device	☑	
13	Test Page	☑	
14	Horn and Light	☑	
15	PABX	☑	
16	Talkgroup Scan	☑	
17	Packet Data	☑	
18	Home Mode Display	☑	
19	Group Hot Mic	☑	
20	DMO Gateway	☑	
21	One-Touch Feature	☑	
22	My Favorite Groups	☑	
23	Speed Dialing	☑	
24	GPS	☐	
25	Tx Audio High Pass Filter	☐	
26	TNP1 Support	☑	
27	Selected Network Enabled	☑	
28	Address Book Restrictions	☐	
29	Talk Group Dialing by Index	☑	
30	WAP	☐	
31	Mail Out To Group	☐	
32	Direct Mode (DMO) Semi-Duplex Private Call	☑	
33	Packet Data Page Enable	☐	
34	Multislot Packet Data	☐	
35	DMO Repeater	☑	
36	Clear LA Blacklist on Talk Group Change	☐	
37	Remote Programming	☑	
38	Call-Out	☐	

When the CPS is opened with the ‘Admin Login’ option, this menu has 37 options. These options are used to enable/disable terminal features.

14.1 Group

This refers to group call and is the main communication tool of TETRA and is a factory preset.

14.2 Status

This messaging feature enables the user to send and receive status. A status is a number corresponding to a pre-programmed message in the terminal's programmable status list. On reception of the status number, the terminal will look the number up in its status list and display the text associated with the number..

Related fields are:

Paragraph 29.2 "Status ID List"

Paragraph 29.4 "Short Data Service (SDS)"

Paragraph 31.4 "One Touch Buttons"

Paragraph 31.4.11 "Sending Status"

14.3 Targeted Status

This option is used to enable/disable the Targeted Status feature in the terminal. If enabled, the user is able to send a predefined Status Message to an individual (ISSI) via a button programmed with this feature.

See the following:

Paragraph 29.2 "Status ID List"

Paragraph 29.4 "Short Data Service (SDS)"

Paragraph 31.4 "One Touch Buttons"

Paragraph 31.4.11 "Sending Status"

14.4 Semi-duplex Private Call

This option is used to enable/disable the Semi-duplex Private Call feature in the terminal. Also called Private Call or Express Connect Call. In this type of one-way call, the user presses and holds the PTT while talking, and releases the PTT while listening.

Note: This is the only method of keying the terminal for call set up of Group Calls and keying during the call.

14.5 Private Duplex

This option is used to enable/disable the Private Duplex feature in the terminal. Also called Private Net Phone Call. If this method is used for Private Call set up, the terminals involved in the call will behave as normal telephones with 2-way conversation - users will not have to press the PTT button.

Received calls are accepted by pressing the button with the red & green telephone handset icon. Press the button to clear the call.

14.6 Direct Mode (DMO)

This option is used to enable/disable the Direct Mode (DMO) feature is in the terminal. This feature enables the terminal to work as a 2-way terminal and communicate directly with another subscriber(s) of the talkgroup without the need for system infrastructure. Particularly useful when the phone is out of coverage. In this mode the subscriber can not receive or make system - Group calls, Private Calls, Telephone Interconnect Calls and Status Messages. The phone will not receive system error and maintenance messages.

Note: DMO Emergency Calls are supported by the terminal.

See the following:

Paragraph 22 "DMO Parameters"

Paragraph 27.2.2 "DMO Talkgroup List"

Paragraph 31.3 "One-Touch Options"

Paragraph 31.4 "One Touch Buttons"

14.7 Direct Mode (DMO) Reservation

This is a form of ‘Hang Timer’ and is used to keep the channel open for the group. The entry in this field specifies the duration of channel reservation time for DMO calls initiated by the terminal. During the reservation time, other terminals that wish to talk, do not have to set up a new reservation; instead, the current channel reservation may be used until the end of the time-out.

14.8 Telephone Interconnect

This option is used to enable/disable the terminal’s Phone Mode of operation, selectable via the terminal’s mode selection button.

See related fields:

Paragraph 28 "Contact Book"

Paragraph 31.3 "One-Touch Options"

Paragraph 31.4 "One Touch Buttons"

14.9 MS User Application Support Pre-defined Template

The terminal’s Predefined Templates feature can be enabled or disabled by clicking in the check box.

If enabled, the feature allows mail templates to be programmed into the phone. The user is allowed to perform limited editing operations on a predefined template and send it, but is not allowed to store the edited predefined template or erase it from the Templates List.

Related fields:

Paragraph 29.1.1 "Outgoing Mail Options"

Paragraph 29.1.2 "Outgoing Mail List"

Paragraph 31.3 "One-Touch Options"

Paragraph 31.4 "One Touch Buttons"

14.10 Mail In

This is a factory preset feature indicating that the Mail In feature (text messaging) is enabled in the phone. The Mail In feature enables Reception, Reading and Deletion of Messages.

14.11 Mail Out

This option is used to enable/disable the Mail Out feature (text messaging) in the terminal. The Mail Out features allows the user to Create, Store, Send, Reply, and Delete Messages.

Related Fields:

Paragraph 29.1.1 "Outgoing Mail Options"

Paragraph 29.1.2 "Outgoing Mail List"

Paragraph 31.3 "One-Touch Options"

Paragraph 31.4 "One Touch Buttons"

14.12 External Device

Selecting this feature enables the user to connect an external device (also called peripheral equipment) to the phone, such as a laptop or desktop PC. The phone then operates then as a wireless modem, sending or receiving data from another subscriber.

14.13 Test Page

Selecting this option enables field engineers to access various internal data via the test page sub menu.

14.14 Horn & Light

If this feature is enabled, the vehicle’s horn will sound and the lights will flash to announce an incoming private/phone call. This feature requires the installation of a kit.

Check box to enable this option.

14.15 PABX

This option is used to enable/disable the terminal’s PABX Mode of operation.

See related fields:

Paragraph 28 "Contact Book"

Paragraph 31.3 "One-Touch Options"

Paragraph 31.4 "One Touch Buttons"

14.16 Talkgroup Scan

Specifies whether the phone's Talkgroup Scan feature is enabled or disabled.

If this field is enabled, the phone, instead of just monitoring its selected talkgroup will monitor (scan) more than one talkgroup sequentially.

The talkgroups are organized into scan lists that are user selectable. Only one scan list can be active and the terminal continuously monitors the talkgroups of the scan list for activity. The terminal will also monitor the group on which scan was started, this may be an ‘Announcement Talkgroup’ (ATG).

By assigning priorities to the talkgroups defined in the scan list, the handset is capable of accepting calls that have higher priority than the on-going call.

Enable or Disable the feature by clicking in the check box.

Related fields are:

Paragraph 20.4 "Scanning Parameters"

Paragraph 27.1.3 "TMO Scan Lists"

Paragraph 31.3 "One-Touch Options"

Paragraph 31.4 "One Touch Buttons"

14.17 Packet Data

If connected to an external device (such as a laptop or desktop PC), the terminal acts a terminal modem and allows the transfer of data packets.

This feature has three programmable settings that when enabled are user selectable options via the terminal’s menu functionality. The settings are: Data Only Enable, Voice & Data Enable, and Voice Only Enable.

Related field: Data Services\Packet Data Parameters, paragraph 23.3

14.18 Home Mode Display

Enabling this feature will allow the terminal to display pre-programmed information when the terminal is inactive.

14.19 Group Hot Mic

If enabled and the terminal enters emergency mode to set up an Emergency Group Call, the microphone will automatically open and allow the user to talk without having to press the PTT button. Transmission is allowed for a pre-programmed period of time, after which the user must press the emergency button to restore the Hot Mic functionality.

If the emergency alarm button, switch or key is pressed during Hot Mic transmission, the emergency alarm will not be sent, but the Hot Mic Duration Timer will be restarted from the beginning and the voice transmission can continue.

If the PTT is pressed during Hot Mic transmission, Hot Mic transmission state will end, but the terminal will continue to transmit in the normal Emergency PTT operation. The Hot Mic Duration Timer will be cancelled, the normal mic gain will be restored and transmission will be as per normal emergency group call PTT operation.

Hot Mic transmission will end when:

- the user exits emergency mode.
- the Hot Mic Duration Timer expires.
- the user presses an ’end’ key.

In the case where the user exits emergency mode, the terminal will leave the call.

In the cases where the timer expires or the user presses the end key, the terminal will send a U-TX-CEASED message to the system and remain in the call.

In all cases, the mic gain will be restored to its normal value, the Hot Mic Duration Timer and Hot Mic Pending Timer will be cancelled.

If during the call, the terminal receives a D-RELEASE from the SwMI (system), it will stop Hot Mic transmission if is transmitting, cancel the Hot Mic Duration Timer and Hot Mic Pending Time (if they are active) and restore the mic gain to its normal operational value.

If, upon requesting a hot-mic call, the terminal receives a response that transmission was granted to another, it will sound an emergency received tone and enter the call.

If the Transmission Request Permission is set to 'allowed to request for transmission', the terminal will then start a 'Hot Mic Pending Timer'. If the transmission request is not allowed, or if the Hot Mic Pending Timer is disabled, it will go into the Hot Mic Tx Pending state and not start the timer.

In this case the Hot Mic Pending state will end only when the other party stops transmitting.

The terminal will be in a Hot Mic Tx Pending state if the user takes no action and will remain in this state until either the Hot Mic Pending Timer expires, or until the other terminal stops transmitting.

The Hot Mic Duration Timer will not be started until the first 'Tx Granted' message is received.

If, in the Hot Mic Tx Pending state, the transmitting terminal stops transmitting, or the Hot Mic Pending Timer expires, then the terminal will send a transmission request with Tx Demand Priority set to 'Emergency Pre-emptive Priority'. If transmission is granted, the terminal will start Hot Mic transmission, but will not restart the Hot Mic Duration Timer.

If during Hot Mic transmission, it receives a signal that tx permission was granted to another user, it will stop transmitting and sound the incoming voice alert. If the Transmission Request Permission is set to 'allowed to request for transmission', the terminal will start the Hot Mic Pending Timer. If transmission request is not allowed, it will enter the Hot Mic Tx Pending state, but not start the timer. When the other terminal ceases transmission or the Hot Mic Pending Timer expires, it will re-request transmission.

If the PTT is pressed in the Hot Mic Tx Pending state, the terminal will send a request to transmit and cancel Hot Mic operation; normal mic gain will be restored, the Hot Mic Duration Timer and Hot Mic Pending Timer will be cancelled and transmission will follow PTT operation as for normal emergency group calls.

If the emergency button/key is pressed when in Emergency Mode Idle (i.e. the terminal is in Emergency Mode, but there is no active call), an emergency alarm will be sent and the Hot Mic operation will be initiated.

In Emergency Mode the Terminal also accepts normal group calls. If it is in Emergency Mode listening to a normal group call and if the emergency button/key is pressed in the receive state (i.e. listening to another user talking) or in the hang-time state (i.e. there is no talker), the terminal will leave the call, send an emergency alarm and setup a new hot-mic emergency call to the current group.

If the emergency button/switch/key is pressed when the terminal is in Emergency mode in an emergency group call in the receive state (i.e. another user is talking) or in the hang-time state (i.e. there is no talker), the terminal will initiate Hot Mic transmission by sending a U-TX-DEMAND with request to transmit with Tx Demand Priority set to 'Emergency Pre-emptive Priority level'.

Note: The Emergency alarm is not sent in this case as it would prevent the terminal from interrupting the current talker since the terminal would have to leave the call and try to setup a new call after the alarm is completed. In this case the Dimetra IP system will not grant tx permission.

If the terminal is involved in an announcement group call or is still within the Rx-timer period of an announcement group call when the hot-mic transmission is initiated, the Hot Mic group call will be made to the Announcement Group.

Note: In normal circumstances there will not be a case of Rx-hold timer in an emergency call, since the hang timer on the call is very long and the Rx-hold Timer starts when Tx-ceased is received.

Note: Hot Mic functionality does not work when the terminal is in the DMO operational mode.

Related field is:

Paragraph 25.1 "Hot Mic"

14.20 DMO Gateway

This feature allows the terminal to work with DMO Gateway(s).

The DMO Gateway is a device that provides gateway connectivity between terminal and the TETRA Voice and Data (V+D) network. The gateway provides the interface between the TETRA DMO and TETRA V+D modes. A gateway may provide only the gateway function (DM-GATE) or may provide the functions of both a DM repeater and a DM gateway during a call (DM-REP/GATE).

This feature can be Enable/Disable by clicking in the check box.

14.21 One-Touch Feature

This feature enables often used functions to be assigned to a singe button press on the numeric keypad button.

Related fields are:

Paragraph 31.3 "One-Touch Options"

Paragraph 31.4 "One Touch Buttons"

14.22 My Favorite Groups

Enabling this feature allows the user to create a ‘Personal’ range of groups from those held in both the TMO and DMO Talkgroup lists of the terminals memory.

Related field:

Paragraph 27.3 "My Favorite Groups"

14.23 Speed Dialing

Selecting this option will enable the speed dialing functionality of the terminal.

If this feature is enabled, a speed dial number is added to numbers in the contacts list.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

14.24 GPS

Select this option to enable the GPS (Global Positioning System) feature of the terminal.

Paragraph 34 "GPS"

14.25 Tx Audio Hi Pass Filter

The terminal has a High-pass Filter module for all microphone connections. When enabled, the High-pass Filter module reduces the frequencies at the lower end of the frequency

This feature is used to ensure audio clarity in a noisy environment. (This filter is used for certain terminal models. Please consult with your Service Provider.)

This is applicable in TMO and DMO.

Check box to enable this feature.

14.26 TNP1 Support

The TNP1 feature will operate only if Packet Data or External Device is enabled in the codeplug (i.e.: a PPP session with MT2 can be established).

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

14.27 Selected Network Enabled

If enabled, the Selected Network Enabled option will be displayed on the terminal screen. The option allows the terminal user to register to a network of choice from an allowed Network List.

Check box to enable this feature.

14.28 Address Book Restriction

When the Address Book Restriction feature is enabled, the user will be allowed to initiate a private/ phone/PABX call if a number stored in the list of received calls exists in the address book.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

14.29 TG Dialing by Index

The Talk Group (TG) Index feature can be entered via the keypad when only in either TMO or DMO talk group mode, in idle or receiving but nor transmitting.

In this mode the terminal does not look at the Talk Groups per range, but as consecutive numbers from the first talk group of range 1 to the last talk group in the last enabled range. i.e. 4 ranges of 16 talkgroups is equal to a list of 64 continuous talk groups, where a keypad entry of 17 equates to the first talk group of range 2.

To enable this functionality, the required keypad presses are of a shorter duration than that required when using the one touch button functionality.

Once the first digit has been entered a ‘Find’ soft menu appears and on completion of the talkgroup digit entry, pressing the associated soft button will cause the talk group to be displayed. Once the talk group is displayed, the user is then presented with the ‘Cancel’, ‘OK’ selectable soft button options.

Selecting ‘OK’ will attach the terminal to the group, or pressing the PTT will attach the terminal to the group and set up a call to that selected group.

The terminal will actively remain on the last selected talk group during the search process and calls can be heard and answered via the PTT while the search screen is still displayed, thus allowing the user to complete the talk group selection process.

Incorrect keypad entries are cleared using the ‘Clear’ option of a soft button.

It is also possible to enter a known talk group GSSI via the keypad and press the PTT to set up a call without using the search functionality above.

14.30 WAP (Wireless Application Protocol)

If enabled, allows the terminal to access the internet.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

14.31 Mail out to Group

If enabled, allows the user to send a mail to a group.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

14.32 Direct Mode (DMO) Semi-Duplex Private Call

Indicates whether the Direct Mode (DMO) Semi-duplex Private Call feature is enabled or disabled in the phone. Also called DMO Private Call.

In this type of one-way call, the user presses and holds the PTT while talking, and releases the PTT while listening.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

14.33 Packet Data Page Enable

Enabling this feature will allow the terminal to display the packet data page.

14.34 Multislot Packet Data

Specifies whether the Multislot Packet Data is supported or not.

When enabled on the terminal and the network, the Multislot Packet Data allows for faster Packet Data transfer.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

14.35 DMO Repeater

Indicates whether the terminal supports the repeater feature or not.

The repeater enables to support Direct Mode communications over an enhanced coverage area as compared to that typically achieved in direct MS-MS operation. Note that an MS will not join a call initiated via a DMO repeater if it was received directly from the calling Direct Mode MS.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

14.36 Clear LA Blacklist on Talk Group Change

The Blacklist list stores sites that rejected the Mobile Station (MS) previously. If this feature is enabled, the list will be cleared each time a new talkgroup is selected.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

14.37 Remote Programming

If enabled, allows programming a mobile terminal via a network without the need of bringing it manually into programming mode.

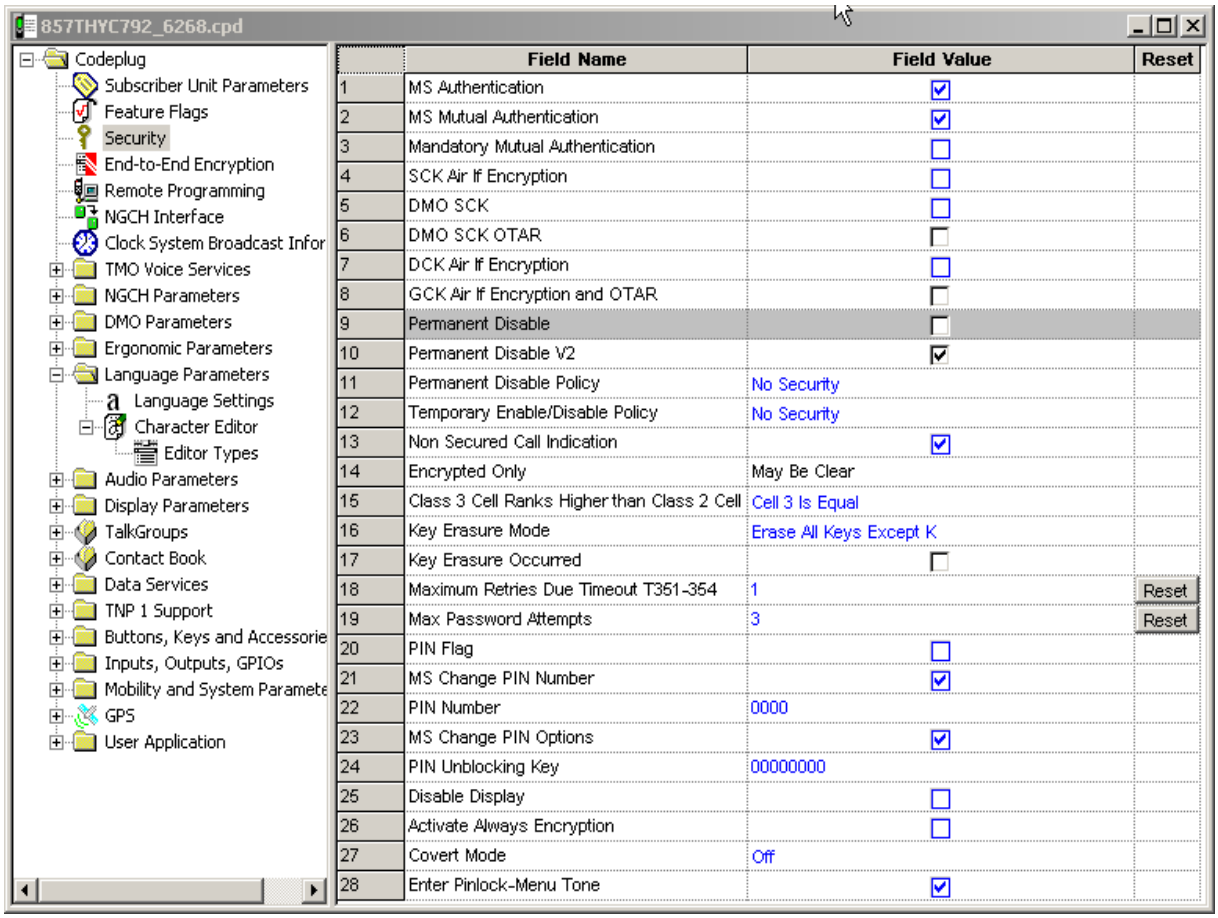
Turn the check box on (Enable) or off (Disable) by clicking in the check box.

14.38 Call-Out

If enabled, allows Call-Out alerts to be sent and received.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

15 Security



15.1 MS Authentication

This feature may be required for several different reasons, see Chapter 2 Paragraph 9.2.

Checking the box enables/disables the MS Authentication Feature.

During normal operation the Switching and Management Infrastructure (SwMi) of the system may require the terminal (mobile subscriber - MS) to authenticate, to allow access to the system

services. The terminal may also require SwMi to authenticate, thus making the authentication mutual

The authentication centre (AuC) manages the assignment, control and distribution of encryption key information to the (SwMI), and manages keys for Air Interface Encryption and Authentication services for the Dimetra infrastructure entities.

Note: Authentication and encryption require key storage/provisioning to be functional, to make these features operational.

Note: The terminal, and SwMi encryption and authentication support are classified into 3 classes:

- Class 1 – no encryption, may use authentication;
- Class 2 – SCK encryption, ESI with SCK, may use authentication;
- Class 3 – DCK encryption, ESI with CCK, authentication.

15.2 MS Mutual Authentication

Enables/disables authentication initiated by SwMi and made mutual by terminal.

The SwMi initiates the process by challenging the terminal to prove its authenticity (“authentication of the MS…”). The terminal responds with its proof of authenticity and a challenge of its own to the SwMI (“…made mutual by the MS”).

The authentication centre (AuC) manages the assignment, control and distribution of encryption key information to the Switching and Management Infrastructure (SwMI), and manages keys for Air Interface Encryption and Authentication services for the Dimetra infrastructure entities.

Note: Authentication and encryption require key storage/provisioning to be functional, to make these features operational.

Note: The terminal, and SwMi encryption and authentication support are classified into 3 classes:

- Class 1 – no encryption, may use authentication;
- Class 2 – SCK encryption, ESI with SCK, may use authentication;
- Class 3 – DCK encryption, ESI with CCK, authentication.

15.3 Mandatory Mutual Authentication

If this feature is enabled, it indicates that SwMI authentication is mandatory.

15.4 SCK Air If Encryption

This field contains the Class of MS and the all MS information elements to indicate the infrastructure the characteristics of the MS terminal support (Authentication-flag, SCK-AI).

15.5 DMO SCK

Indicates if the MS supports DMO SCK feature. DMO SCK is to represent SCKs designated for secure DMO.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

15.6 DMO SCK OTAR

Indicates whether DMO SCK Keys can be delivered to the MS by OTAR.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

WARNING: The DMO SCK OTAR feature flag shall only be enabled on the MS in one of the following 2 conditions: - The current System supports SCK OTAR (e.g. SR6.1) and the MS belongs to a CMG
- The current System does not support SCK OTAR (e.g. SR5.2), the current System operates with TMO SCKs 31 and 32 only, DMO SCK is not being used, and the customer plans to upgrade his System to an SCK OTAR System and add the MS to a CMG.
Enabling the DMO SCK OTAR feature for an MS operating on a System not supporting DMO SCK OTAR will result in the deletion of SCKs provisioned by KVL except SCKs 31 and 32. Therefore, unless the System only uses SCKs 31 and 32 for TMO operations in Security Class 2, the MS will not be able to operate in TMO Security Class 2 on such a System and DMO SCK will not operate because the DMO SCKs would have been deleted. To recover from such a configuration mistake, the DMO SCK OTAR flag needs to be disabled and SCKs need to be reloaded via KVL.

15.7 DCK Air If Encryption

This field contains the Class of MS and the all MS information elements to indicate the infrastructure the characteristics of the MS terminal support.

15.8 GCK Air If Encryption and OTAR

Indicates if MS shall support GCK AIE and OTAR feature.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

15.9 Permanent Disable

When enabled, the radio will be permanently killed, when it receives the Permanent Disable command. The radio’s software, codeplugs and security key material are deleted. Any of those information cannot be recovered over the air but needs to be reprogrammed by the Service Provider.

15.10 Permanent Disable V2

If enabled, the radio will appear dead to the user when it receives the Permanent Disable command. The radio’s security key material is deleted and the radio cannot be recovered over the air.

Unlike Permanent Disable, for Permanent Disabled V2 the radio can be re-enabled by the customer provider.

Turn the check box on (Enable) or off Disable) by clicking on the check box.

15.11 Permanent Disable Policy

This feature is used to accept or reject Permanent Disable commands sent by the Switching and Management Infrastructure (SwMi) of the system when the command had not been implicitly authenticated using AI (Air Interface) encryption.

The options are:

- No Security - no security is checked when radio is processing the Permanent Disable command.
- Encryption Required - the command must be encrypted for it to be processed

- Authentication Required - the command must contain an Authentication Challenge flag, otherwise it will be rejected. For this, a valid K key must be loaded into the terminal
- Mutual Authentication Required - the command must contain an Authentication Challenge flag, otherwise it will be rejected. In addition the radio will initiate mutual authentication prior to processing the command. For this, a valid K key must be loaded into the terminal.
- Encryption and Authentication Required - the command must be encrypted and contain an Authentication Challenge flag, otherwise it will be rejected. For this, a valid K key must be loaded into the terminal
- Encryption and Mutual Authentication Required - the command must be encrypted and contain an Authentication Challenge flag, otherwise it will be rejected. In addition the radio will initiate mutual authentication prior to processing the command. For this, a valid K key must be loaded into the terminal

15.12 Temporary Enable/Disable Policy

This feature is used to accept or reject Temporary Enable / Disable commands sent by the Switching and Management Infrastructure (SwMi) of the system when the command had not been implicitly authenticated using AI (Air Interface) encryption.

The options are:

- No Security
- Encryption Required
- Authentication Required
- Mutual Authentication Required
- Encryption and Authentication Required
- Encryption and Mutual Authentication Required

15.13 Non Secured Call Indication

Specifies whether or not the Non Secured Call Indication feature is enabled in the phone. When enabled, this feature warns the user about unencrypted incoming calls.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

15.14 Encrypted Only

Enabling this option will cause the terminal to only search for cells supporting encryption at power on or each cell reselection. The terminal will not register in any cell using ciphering off, in case the flag is set to encrypted-only.

The options are:

- Encrypted Only.
- May Be Clear.

15.15 Class 3 Cell Ranks Higher than Class 2 Cell

If this feature is set to "Cell 3 is better", it means that a cell operating in Security Class 3 will be ranked higher than a cell operating in Class 2

If this feature is set to "Cell 3 is equal", it means that a cell operating in Security Class 3 will be ranked equal to a cell operating in Class 2.

It is only relevant to terminals supporting Static Cypher Key (SCK) and Dynamic Cypher Key (DCK).

The options are:

- Cell 3 is Better.
- Cell 3 is Equal.

15.16 Key Erasure Mode

This option is used to erase the encryption keys prior to the terminal going for service, or when the vehicle in which a (mobile) terminal is mounted is sent for service. This mode may also be used to remove all key material from a terminal in emergency situations.

An terminal that supports air interface encryption will initiate erasure of cipher keys (SCK) stored in the terminal on detection of a unique terminal front panel key sequence. This sequence will only be processed when the terminal is in the idle or emergency states.

On detection of an emergency key-erase operation, the terminal operational state will be Temporary MS Disable (Equipment). The terminal will send an unsolicited PDU to the SwMi (if the terminal is currently registered), to indicate that it has gone into this state. As this PDU must be sent encrypted, it will be sent prior to performing the key erasure (if terminal is registered).

Select one of the following options:

- **Erase All Keys Except K** – when the key erase key sequence is entered on the terminal it will erase only SCKs, not Authentication Ks.
- **Delete All Keys** – when the key erase key sequence is entered on the terminal it will erase SCKs and K.

Provisioning of K and the SCK into the terminal will be done using the KVL.

To select the option, put the pointer into the field value, click on the arrow, and drag the pointer to the desired option.

Note: Authentication and encryption require key storage/provisioning to be functional, to make these features operational.

Note: The terminal, and SwMI encryption and authentication support are classified into 3 classes:

- Class 1 – no encryption, may use authentication;
- Class 2 – SCK encryption, ESI with SCK, may use authentication;
- Class 3 – DCK encryption, ESI with CCK, authentication.

Related Field is:

Paragraph 15.17 "Key Erasure Occurred"

15.17 Key Erasure Occurred

If enabled the terminal will store an indication in the codeplug that key Erasure occurred. This flag will only be set on successful erasure of the encryption keys.

This flag can only be cleared by re-provisioning a new codeplug into the terminal, using the depot CPS, or re-enabling the terminal over air (where possible).

This feature is Enabled/Disabled by clicking in the check box.

Related Field is:

Paragraph 15.16 "Key Erasure Mode"

15.18 Maximum Retries Due Time Out T351- 354

The number in the editable field indicates the maximum number of times the terminal is allowed to send U-LOCATION UPDATE DEMANDs due to time out of the timers T351-354.

Where authentication occurs embedded within a registration procedure, timer T351 (registration timer) shall be treated as T354 (authentication timer) and as such only one timer needs to be invoked. The terminal uses the registration timer T351 value for the terminal authentication timer during explicit authentication.

The terminal starts the T351_354 timer on receiving the D-AUTHENTICATION DEMAND from the SwMI.

The terminal will terminate T351_354 under the following conditions:

- Terminal Link Loss
- On receipt of D-AUTHENTICATION UPDATE ACCEPT containing the type-3 element “Authentication downlink”
- On receipt of D-LOCATION REJECT
- On sending U-AUTHENTICATION RESULT for authentication initiated by the SwMI and made mutual by terminal

If the authentication timer T351_354 expires, the terminal will again attempt to send the location update demand before reverting to its previous mobility management state, prior to the authentication attempt. The range of the timer is 1 - 255 seconds and the default setting is 1 second.

15.19 Max Password Attempts

This field defines the number of attempts that can be made to unlock the terminal, after which the phone will not allow any more attempts. Only entry of the longer PIN Unlock Key (PUK) code can unlock the phone.

The range for this option is 1 - 255. Default setting is 3.

15.20 PIN Flag

This feature is used to enable/disable the PIN facility and the default value of this option is “enabled”. Upon power on, the terminal prompts the user to enter the valid 4 digits PIN1 value before allowing access to any of the services available from the network or features of the terminal. Following three consecutive failed attempts the terminal is temporarily blocked and will remain in this state even through a power reset. PIN1 can be changed via CPS and the terminal’s user menu functionality.

Once blocked only entry of the longer PIN Unlock Key (PUK) code can unlock the phone.

15.21 MS change PIN Number

If enabled, this field allows the user to change the pin number (unlock code) of the terminal.

Do Not use any spaces when entering the Pin Number.

15.22 PIN Number

This field is used to define the passcode required to unlock the phone after it has been locked.

During pin number entry, asterisks are displayed instead of the number.

15.23 MS change PIN Options

If enabled, this field allows the user to change the available pin options, i.e. the number of allowed password attempts.

15.24 PIN Unblocking Key

This field is used to define the 8 digit code used to unlock the phone when passcode entry has been blocked.

15.25 Disable Display

If this option is not selected, no visual indication will be displayed when the phone is disabled.

Check the box to enable this feature and display the disabled indication when the terminal is disabled.

15.26 Activate Always Encryption

If enabled, the terminal will block any unexpected clear outgoing PDUs.

Use carefully as this feature, if enabled, will prevent the terminal from operating on any clear system.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

15.27 Covert Mode

Indicates whether the Covert Mode is On or Off.

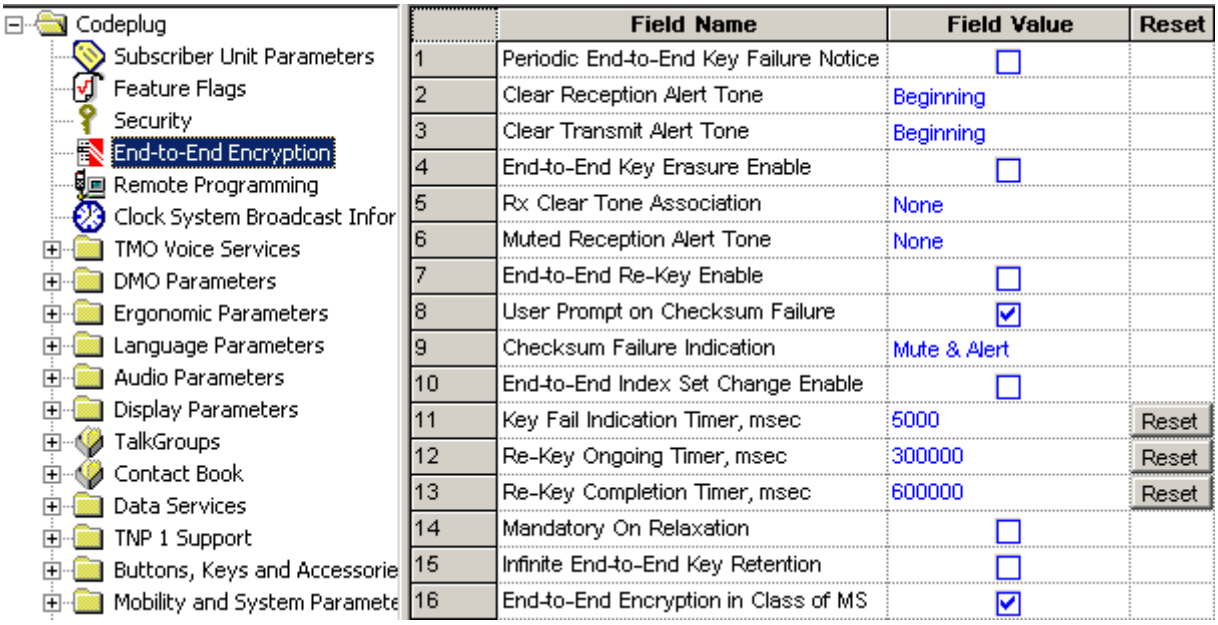
To select the option, put the pointer into the field value, click on the arrow, and drag the pointer to the desired option.

Turn the check box on or off by clicking in the check box.

15.28 Enter Pinlock-Menu Tone

This feature is Enabled/Disabled by clicking in the check box.

16 End to End Encryption



	Field Name	Field Value	Reset
1	Periodic End-to-End Key Failure Notice	☐	
2	Clear Reception Alert Tone	Beginning	
3	Clear Transmit Alert Tone	Beginning	
4	End-to-End Key Erasure Enable	☐	
5	Rx Clear Tone Association	None	
6	Muted Reception Alert Tone	None	
7	End-to-End Re-Key Enable	☐	
8	User Prompt on Checksum Failure	☑	
9	Checksum Failure Indication	Mute & Alert	
10	End-to-End Index Set Change Enable	☐	
11	Key Fail Indication Timer, msec	5000	Reset
12	Re-Key Ongoing Timer, msec	300000	Reset
13	Re-Key Completion Timer, msec	600000	Reset
14	Mandatory On Relaxation	☐	
15	Infinite End-to-End Key Retention	☐	
16	End-to-End Encryption in Class of MS	☑	

End to End (E2E) encryption, unlike the TEA encryption types, is not an air interface encryption and is seamless to a system, i.e. it will pass through a system without being decrypted.

As its name implies it is an encryption used between terminal users, both individual and groups.

If TEA encryption is used, the receiving base station must decrypt the incoming message to determine its destination, but with E2E encryption only the information packet is encrypted, the addressing information is not. This means that with E2E encryption there is no possibility to compromise the encrypted information.

16.1 Periodic End-To-End Key Failure Notice

If this box is checked, the user is alerted when ever key failure occurs. The alert is repeated at a time interval set by the ‘Key Fail Indication Timer’.

16.2 Clear Reception Alert Tone

There are 3 possible options for this feature, including ‘None’ (no tone alert). An alert can either be sounded at the beginning only, or continually whenever a non-encrypted (clear) call is received.

16.3 Clear Transmit Alert Tone

There are 3 possible options for this feature, including ‘None’ (no tone alert). An alert can either be sounded at the beginning only, or continually whenever a non-encrypted (clear) call is Transmitted.

16.4 End-To-End Key Erasure Enabled

If this option is selected, The user is able to erase the encryption keys.

Note: the keys should always be erased (if possible) if the terminal is being returned for repair etc.

16.5 Rx Clear Tone Association

This field defines the condition for sounding a clear reception alert tone. the three options are none, always or by association.

16.6 Muted Reception Alert Tone

There are 3 possible options for this feature, including ‘None’ (no tone alert). A muted alert can either be sounded at the beginning, or continually whenever a non-encrypted (clear) call is received

16.7 End-To-End Re-key Enable

This option defines whether or not the key request option is active.

16.8 User Prompt on Checksum Failure

Specifies whether a user prompt is displayed on an End-to-End synchronization frame checksum failure. The message prompt indicates that a checksum failure has occurred.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

Note: The user may attempt to resynchronize the real time clock (RTC) manually or over the air (by switching to TMO if in DMO) on the CCSUM failure indication. This may not clear the error depending on the cause of the checksum failure.

16.9 Checksum Failure Indication

This option defines how the terminal will behave if a checksum failure occurs. the options are:

- Mute
- Mute & Alert
- Unmute & Alert
- Unmute & Overtone
- Unmute

16.10 End-To-End Index Set Change Enabled

Selecting this check box option will allow the user to change the active index set.

16.11 Key Fail Indication Timer

This option is used to set the periodic time interval for the Key Fail Alert.

See Paragraph 16.1 "Periodic End-To-End Key Failure Notice" above.

16.12 Re-Key Ongoing Timer

This option is used to set the response time interval after which the user will be alerted that no response has been received from the KMF to a re-key request.

16.13 Re-Key Completion Timer

The entry in this field defines the time after which the user is alerted when a re-key request has not been completed.

16.14 Mandatory On Relaxation

This check box determines whether or not a received clear call is Accepted/Unmuted or Rejected/ Muted when the default mode of the accosiation is Mandatory On.

16.15 Infinit End-To-End Key Retention

Selecting this option enables the terminal to permanently store encryption keys even when the battery is removed.

16.16 End-To-End Encryption in Class of MS

This field indicates whether the terminal is E2E capable or not. This is a sub-element of Class of terminal Information element.

This field is set to Enabled in power-up if the terminal is equipped with the UCM.

Turn the check box on (Enable/Encrypted) or off (Disable/Clear) by clicking in the check box.

17 Remote Programming

Allows programming of a MS from a remote server connected via a local network to the handset cradle. Benefits of this feature include:

- MS can be programmed without needing the user to manually bring it into programming mode. This is especially useful for large systems having thousands of terminals.
- MS can be put into programming mode while it is charging.
- It is possible to support management of different software and codeplug versions of MS within the system.
- This feature also offers a standard API for accessing parameters of each MS. It is then possible to directly connect a fleet mapping or system configuration tool in order to do full system and terminal management using a single tool. Previously, a file comma separated value (CSV) formatted has to be generated and imported into CPS.

17.1 Communication Timeout Timer

Defines the timeout duration until a loss of a communication between MS and PC or beetween control head and transceiver is notified to the user on the display of MS.

18 NGHC Interface

This menu option lists the NGCH interface parameters which are necessary to configure the control head. This includes the definition of interface to the radio as well as accessory interfaces and General Programmable Input Output pins (GPIO).

18.1 Physical Layer

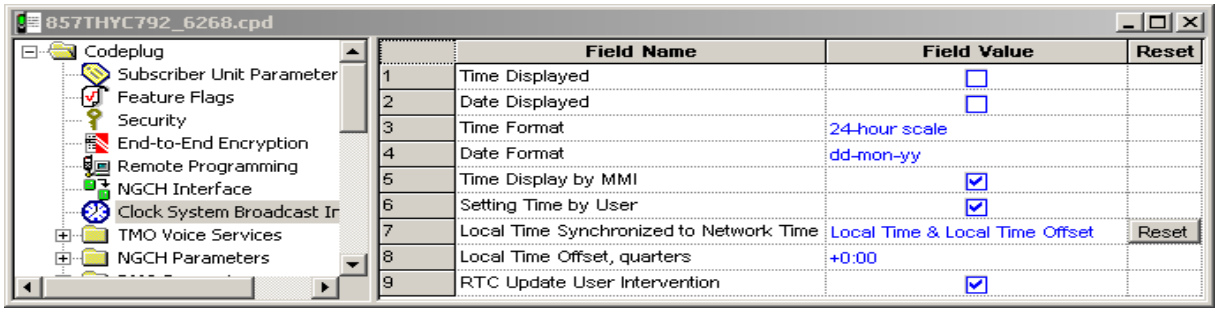
Defines which physical interface is used to connect the radios.

There are 2 interfaces to choose from:

- One-wire - a one wire digital interface for exchanging data between control head and radio.
- Two-wire - a two-wire digital interface for exchanging data between control head and radio.

Note: It is important to configure NGCH and the connected radio in the same way, i.e. both needs to support the same physical interface. Otherwise no communication is possible. The traditional MTM800 is able to support "one-wire" only.

19 Clock System Broadcast Information



The System Broadcast Information is sent over the air interface to provide the parameters that the MS needs in order to access the SwMI system.

As a part of the system synchronisation information, TETRA network time information element in D-NWRK-BROADCAST PDU is sent to the MS. The MS uses this element for the Time Received & Displayed feature.

The Time Received & Displayed feature allows to:

- Automatically update time according to the current time zone when in TMO mode or if Dual Watch is on and use of MS internal clock when in DMO mode or in DMO base mode if Dual Watch is off or out of service.
- Display time-of-day and date on the MS screen.
- Time-stamp text messages and status received by the MS. The SDS (Short data Services) feature will include date stamp information the MS received from the network's broadcast of Time & Date.

19.1 Time Displayed

Defines whether time is displayed to the MS user.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

The setting of this parameter can also be changed via the MS MMI.

19.2 Date Displayed

Determines if date should be visible on home screen and one-touch button Time-Display action.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

The setting of this parameter can also be changed via the MS MMI.

19.3 Time Format

Defines the time format to be displayed to the MS user.

The possible values are "24-h clock" or "12-h clock".

To change the setting, select the field value, and select desired setting.

The setting of this parameter can also be changed via MS MMI.

19.4 Date Format

Sets the date format (DD - day number, MM - month number, MON - month abbreviation, YY - year number).

The options are:

- dd/mm/yy
- mm/dd/yy
- dd-mon-yy
- yy-mm-dd

To select the option, put the pointer into the field value, click on the arrow, and drag the pointer to the desired option.

The setting of this parameter can also be changed via the MS MMI.

19.5 Time Display by MMI

The field defines whether the user is given the possibility to enable/disable displaying time and date information in the MS and changing the displayed time and date format.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

19.6 Setting Time by User

The field defines whether the user is given the possibility to set time and date.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

19.7 Local Time Synchronized to Network Time

Defines if the radio Local Time is going to be updated with the:

- None - Local Time of the radio wil not be updated with the network time
- Local Time - just the Local Time is going to be updated with the network time
- Local Time & Local Time Offset - both are going to be updated with the network settings.

19.8 Local Time Offset

Determines how many quarters the local time is shifted in comparison to UTC time. The range is from -14:00 to +14:00.

To select the option, put the pointer into the field value, click on the arrow, and drag the pointer to the desired option.

19.9 RTC Update User Intervention

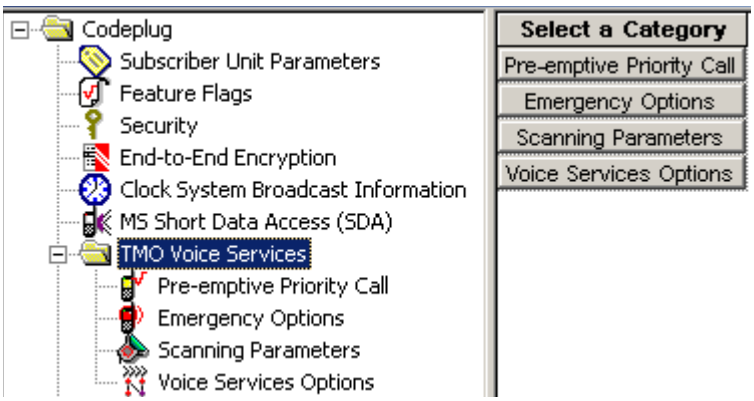
For the E2E radios the parameter determines if the user should be asked to accept changing the radio internal clock.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

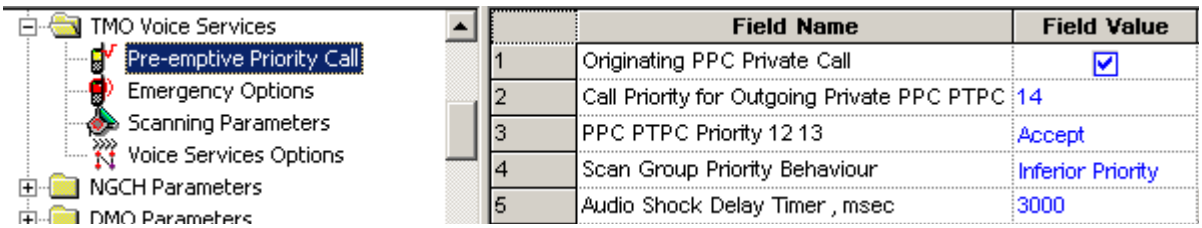
20 TMO Voice Services

This menu has the following 5 sub menus

- Pre-emptive Private Call
- Emergency Options
- Scanning Parameters
- Voices Services Options



20.1 Pre-emptive Priority Call (PPC)



There are five editable options in this menu.

A Pre-emptive Call is not a call that enables a user to go to the top of a queue. If two people, A & B, are in a call and a user C, with pre-emption wishes to talk to B, then the call set up for user C will interrupt (drop) the A/B call to set the call up with B.

User A has been pre-empted.

20.1.1 Originating PPC Private Call

Selecting this check box allows PPC Private Calls to be made using this terminal.

20.1.2 Call Priority for Outgoing Private PPC PTPC

This option is used to define the PPC priority used when initiating a PPC PTPC.

PPC - Pre-emptive Priority Call.

PTPC - Point to Point Call.

The range is 12-15. Priority 15 is also the emergency call priority, but pre-emption will not interrupt an emergency call.

Note:

- If the call priority of the incoming PPC call is set to 12 or 13, the terminal will either allow the call or reject it without any intervention by the user.
- If the call priority of the incoming PPC call is 14 or 15, the active non-emergency call will be pre-empted.
- In Data mode, the terminal will only accept a PPC call with Emergency priority 15.

The following fields below must be enabled for this feature to work:

- Semi-duplex Private Call
- Private Duplex

Related fields are:

- PPC PTPC Priority 12 13 - paragraph 16.1.3

20.1.3 PPC PTPC Priority 12 13

Indicates whether or not a PPC with call priority 12, 13 is accepted during a normal call.

PPC - Pre-emptive Priority Call.

PTPC - Point to Point Call.

There are two options:

- Accept – the PPC call will interrupt the ongoing call.
- Reject – the PPC call will not interrupt the ongoing call.

The option is selected by clicking on the down arrow in the field value box and drag the pointer to the required option.

Requirements for the terminal to accept a PPC PTPC call during a non-emergency call are:

1. The active call is one of the following:
   - PTPC
   - Selected/ATG/Broadcast Group Call
   - Scan Group Call, and the terminal is configured to Scan Group Equal Priority.

   The terminal will accept the PPC PTPC call during a non-emergency call:

   - If the incoming PPC PTPC priority is 14 or 15 and higher than the priority of the active call.

- If the incoming call priority is 12 or 13 and higher than the priority of the active call, and “Accept/Reject PPC PTPC priority 12,13 is set to “Accept”.

2. The active call is a Scan Group Call and the terminal is configured to Scan Group with lower Priority.

The terminal will accept the PPC PTPC call during a non-emergency call:

- If the call priority of the incoming PPC PTPC is 14 or 15.
- If the call priority of the incoming PPC PTPC is 12 or 13 and “Accept/Reject PPC PTPC priority 12,13 is set to “Accept”.

20.1.4 Scan Group Priority Behaviour

This field has 2 options and defines whether or not the terminals active scan group priority is less than or equal to that of an incoming PPC group call

Indicates whether or not a PPC with call priority 12, 13 is accepted during normal call.

The two options are:

- **Inferior Priority** – the PPC group call will interrupt an on going group call.
- **Equal Priority** – if this option is chosen, the user will be given the choice of dropping the on going call and accepting the new PPC group call, or rejecting the new PPC group call and continuing with the on going group call.

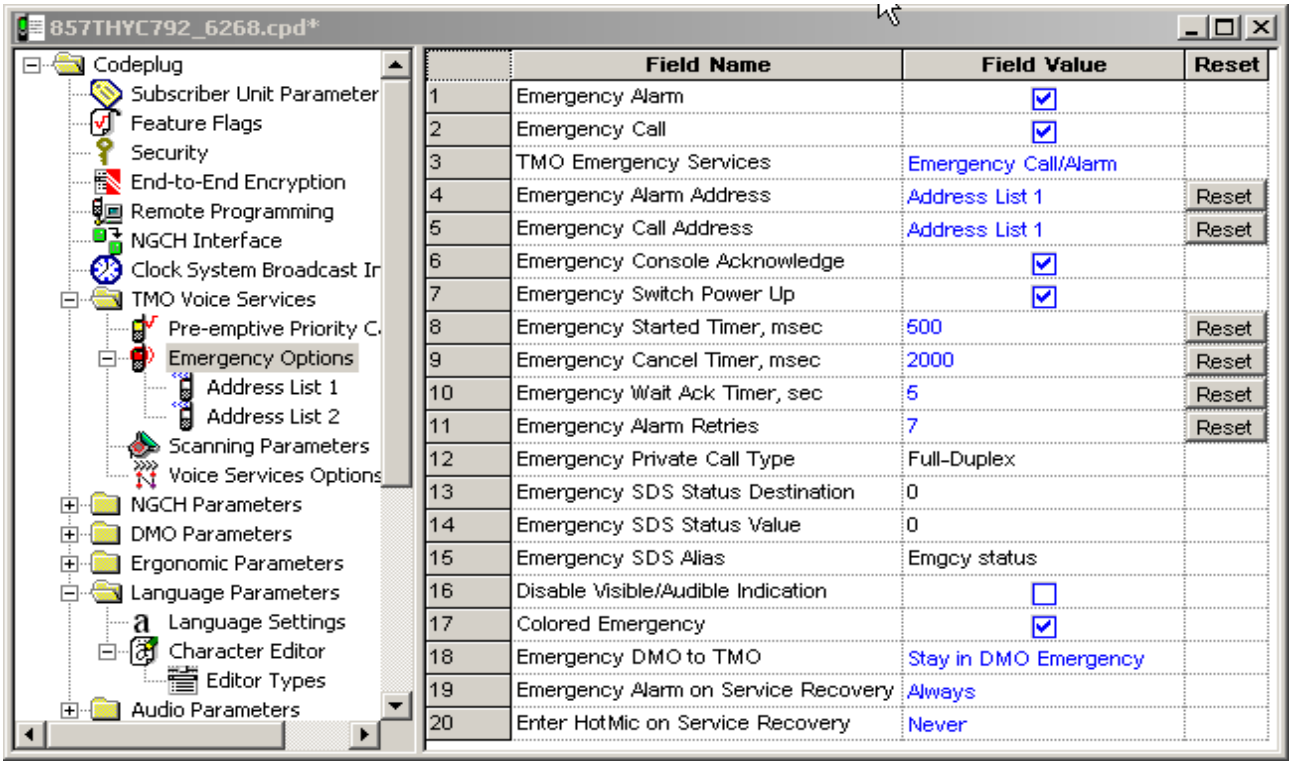
The option is selected by clicking on the down arrow in the field value box and drag the pointer to the required option.

20.1.5 Audio Shock Delay Timer

Period of time in milliseconds. Defines time delay required to eliminate audio shock.

Audio shock occurs when the user receives the audio of the old call in the earpiece and the audio of the new call is sent immediately to the speaker that may be very close to the user’s ear.

20.2 Emergency Options



Related fields are:

Paragraph 14.19 "Group Hot Mic"

Paragraph 25.1 "Hot Mic"

20.2.1 Emergency Alarm

If Emergency Alarm is enabled in the terminal and upon entry into emergency mode, the terminal will send an emergency alarm. Any subsequent pressing of the emergency button will resend the alarm.

To initiate an emergency alarm, the user presses the emergency key for a period of time determined by the Emergency Started Timer, the phone will emit an Emergency Start tone to indicate that the terminal has successfully entered Emergency mode and has sent an Emergency Alarm.

Related fields are:

Paragraph 20.2.2 "Emergency Call"

Note: The terminal is able to enter emergency mode directly from the powered off state by pressing and holding down the emergency button if set up in the CPS, refer to Paragraph 20.2.7 "Emergency Switch Power Up"

20.2.2 Emergency Call

This option is used to enable/disable the emergency call feature in the terminal.

Also called PPC Group Call, which is an outgoing group call with emergency call priority made from Emergency mode only.

To send an emergency call, the user enters Emergency mode to initiate an Emergency Call and presses the PTT, unless the Hot Mic feature is enabled.

See related fields:

Paragraph 25.1 "Hot Mic"

20.2.3 TMO Emergency Services

There are two TMO Emergency Services options:

- Emergency SDS (Short Data Service) Status
- Emergency Call/Emergency Alarm

To change the setting, select the field value, then select desired setting.

The following occurs:

- If you select Emergency SDS Status, Emergency Call and Emergency Alarm fields will be "greyed out".
- If you select Emergency Call/Emergency Alarm, Emergency SDS Status Destination, Emergency SDS Status Value, and Emergency SDS Alias will be "greyed out".

20.2.4 Emergency Alarm Address

Indicates whether “Address List 1” or “Address List 2” is used at the destination address in the event of an Emergency Alarm.

To change the address list, put the pointer into the field value, click on the arrow, and drag the pointer to the desired selection.

20.2.5 Emergency Call Address

Indicates whether “Address List 1” or “Address List 2” is used at the destination address in the event of an Emergency Call.

To change the address list, put the pointer into the field value, click on the arrow, and drag the pointer to the desired selection.

20.2.6 Emergency Console Acknowledge

This feature determines whether or not the terminal should expect an acknowledgement to an Emergency Alarm or Priority Dialing (Priority Dispatch Number) from the RCM (Radio Control Manager)/Dispatcher.

The feature is Enable/Disable by clicking in the check box.

20.2.7 Emergency Switch Power Up

This feature enables the terminal to be powered up and enter emergency mode by an external source that provides the necessary emergency input.

20.2.8 Emergency Started Timer

This defines the period of time in milliseconds that the user must keep the emergency button pressed for the terminal to enter emergency mode.

The programmable range is 1 - 5000 msecs.

The default is 500 msecs

Related field is:

Paragraph 20.2.1 "Emergency Alarm"

20.2.9 Emergency Cancel Timer

This defines the period of time in milliseconds that the user must keep the relevant button pressed for the terminal to exit emergency mode.

Note: Ensure that Emergency Alarm or Emergency Call is enabled to activate this timer.

The range for this option is 250 - 3750 msecs. The default is 2000 msecs.

20.2.10 Emergency Wait Ack Timer

This entry defines the period of time in seconds that the terminal will wait for an acknowledgment, between retries, after sending an emergency alarm.

Note: The number of retries is dependent on the Emergency Alarm Retries parameter.

The range for this option is 2 - 60 seconds and the default is 5 seconds.

20.2.11 Emergency Alarm Retries

The entry in this field defines the number of times that the terminal will transmit the emergency alarm in an attempt to receive an acknowledgement to the emergency call.

The range for this option is 0 - 255 and the default is 7.

20.2.12 Emergency Private Call Type

This (non-editable) field shows the call type of the terminal-initiated Emergency Private Call:

Full-Duplex.

20.2.13 Emergency SDS Status Destination

This field defines the destination address for the SDS status. The address is either GSSI or ISSI. Type in the required value.

Applicable if TMO Emergency Services is set to Emergency SDS Status.

20.2.14 Emergency SDS Status Value

This field defines the SDS status value to be sent upon pressing the emergency button/footswitch.

Applicable if TMO Emergency Services is set to Emergency SDS Status.

20.2.15 Emergency SDS Alias

This field defines the SDS status alias displayed on the user’s terminal upon pressing the emergency button/footswitch.

Applicable if TMO Emergency Services is set to Emergency SDS Status.

20.2.16 Disable Visible and Audible Indication

This field is for enabling or disabling audible and visible indication upon pressing the emergency button/footswitch. This field is not applicable for an outgoing Emergency Private call.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

20.2.17 Colored Emergency

When an Emergency Call is initiated, the red color screen provides an extra emphasis to alert the initiating user that the call has been initiated and the receiving users that an Emergency Call is in progress. The feature can be disabled for a more discreet form of emergency where the display will be in normal color.

20.2.18 Emergency DMO to TMO

Sets the behaviour of the MS when user enters Emergency Mode in DMO:

- The MS will stay in DMO Emergency.
- The MS will go into TMO Emergency after attaching to preselected TMO group: "Default TMO TG Index Emergency DMO to TMO".

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

20.2.19 Emergency Alarm on Service Recovery

Defines the number of times the radio sends emergency alarm when the radio returns to RF coverage; for cases where the emergency button was pressed when the radio was out of coverage and the emergency alarm could not be sent.

- · Once - Upon the radio returning to RF coverage, an emergency alarm is sent once. On subsequent loss and recovery of service, no emergency alarm will be sent.
- · Always - Emergency alarm is sent every time the service is recovered.

To change the setting, select the field value, and select the desired setting.

20.2.20 Enter HotMic on Service Recovery

Indicates whether the radio enters into hotmic once or never when the radio returns to RF coverage; for cases where the emergency button was pressed when the radio was out of coverage.

To change the setting, select the field value, and select the desired setting.

20.3 Address List 1 and 2

20.3.1 Emergency Address Type

Defines the type of destination address for the Emergency Call or Alarm initiated by the radio.

The options are:

- Group – If Group Address Type is ‘Tactical’, the MS will send emergency call/alarm to attached talkgroup. If Group Address Type is ‘Non-Tactical’, the MS will send emergency call/alarm to predefined group address.
- Private – The MS will send emergency call/alarm to a predefined individual address.

To change the type of destination address, put the pointer into the field value, click on the arrow, and drag the pointer to the desired selection.

20.3.2 Emergency Group Type

Defines if Emergency Group Call is initiated on the selected Group (Tactical) or on a predefined Group (Non-Tactical).

An Emergency Group Call can be configured as non-tactical or tactical:

- · A non-tactical call initiates on the configured talkgroup. The group might be different than the one displayed on the terminal screen when the user starts the call. When in non-tactical, the user will not be able to switch talkgroups.
- · A tactical (normal) call allows the user to initiate the call on the currently selected talkgroup.

To select an option, put the pointer into the field value, click on the arrow, and drag the pointer to the desired option.

20.3.3 Non-Tactical Alias

Alias of the Non-Tactical Group.

Note: This parameter will only be used in emergency group call.

20.3.4 Emergency ISSI/GSSI

For Group: Configures predefined Emergency GSSI of Non-tactical Group as destination for outgoing Emergency Group Call. If is enabled, the GSSI has to belong to the TMO Talkgroup List.

For Individual: Configures predefined Emergency ISSI as destination for outgoing Emergency Private calls

20.4 Scanning Parameters

This menu has 12 options some of which are dependent on other programmable fields.

Related fields are:

Paragraph 14.16 "Talkgroup Scan"

Paragraph 27.1.3 "TMO Scan Lists"

Paragraph 31.3 "One-Touch Options"

Paragraph 31.4.13 "TMO Talkgroup Scan"

20.4.1 Active List

This option is dependent upon the scan list(s) being populated, otherwise the down arrow in the Field Value box will not display. If a scan list is displayed in this field, the user is able to enable/ disable scanning via the terminal’s menu functionality.

20.4.2 Scan Status

Selecting this option will enable Talkgroup Scanning and is dependent on there being an entry in the Active List.

20.4.3 User List Editing

If this option is enabled, the user is able to add or delete talkgroups from scan lists via the terminal’s menu functionality.

20.4.4 Priority Editing Enabled

If this feature is enabled, the user is able to edit the priorities of the talkgroups in the scan lists.

20.4.5 PTT Operation

There are 2 options for this field value and are selected by clicking the pointer in the field value box and selecting an option. The options defines the PTT operational functionality during scan.

If Talkback has been selected and the terminal ‘lands on’ a talkgroup in the scan list, the user is able to take an active part (PTT).

If the Selected Only option is chosen and the terminal ‘lands on’ a talkgroup in the scan list, the user is only able to listen. PTT is only available on the talkgroup selected via the Talkgroup Select button/ terminal menu functionality.

20.4.6 Presentation Mode

There are 2 options for this field value and are selected by clicking the pointer in the field value box and selecting an option. These options define how received calls, from the selected talkgroup or from the associated ATG, will be presented to the user during an on going call.

Force: If this option is chosen the received call is forced upon the user and interrupts the on-going call (if the incoming call has higher priority than the on-going call).

Presented: This option ‘presents’ the incoming call to the user who is then able to accept or reject the new call.

20.4.7 On/Off Via MMI

If selected, this features enables the terminal’s menu option that allows the user to turn scan on or off.

20.4.8 Block Group Enabled

When enabled, this allows the user to temporarily block the terminal from scanning a particular talkgroup. When the terminal lands on a channel, a soft button option is displayed to the user. Once a talkgroup has been blocked, it will no longer be scanned for activity until the user:

- Stops and restarts the scan.
- Selects another scan list.
- Cycles the terminal’s power.

This feature is Enable/Disable by clicking in the check box.

20.4.9 Priority Presentation Timer

The entry in this field determines how long the priority call should be presented to the user, if the user receives this call in presentation mode. See Presentation Mode above. To activate this timer, the following options must be selected:

- The Talkgroup Scan flag is enabled
- The Presentation Mode flag is set to “Presented”.

The default is 8000 msecs

20.4.10 Scan Hold Timer

This entry determines the time period, in msecs, for how long the scan is disabled while the user sets up a call to a selected group.

The default is 5000 msecs

20.4.11 Rx Hold Timer

This entry determines the time period, in msecs, for how long the call will be monitored after it was released by system in order for the user to hear the answer to a question. During this period of time, a group call with lower priority than the on-going call will be rejected.

To activate this timer ensure the Presentation Mode option is set to “Force”.

The default is 5000 msecs.

Related fields are:

Paragraph 14.16 "Talkgroup Scan"

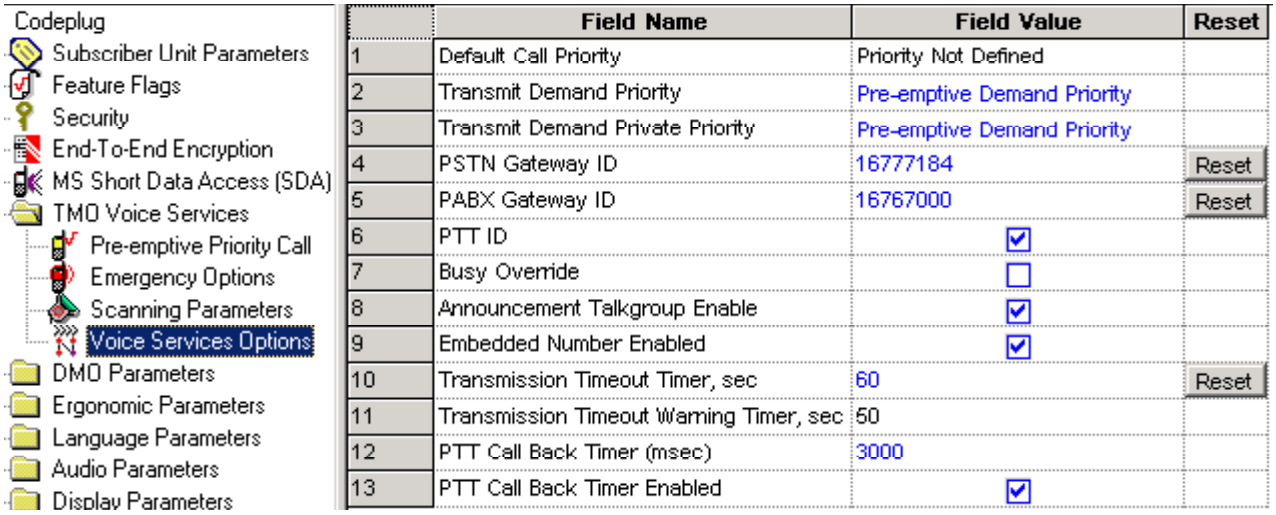
Paragraph 31.3 "One-Touch Options"

Paragraph 31.4.13 "TMO Talkgroup Scan"

20.4.12 Scan List On/Off Over the Air

If enabled the terminal is able to send its scan list to the system.

20.5 Voice Services Options

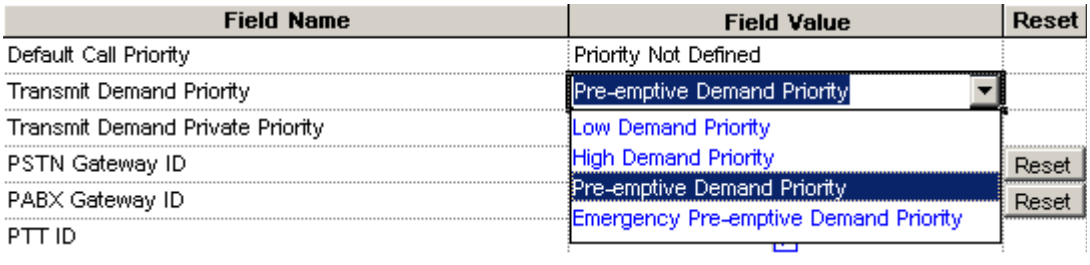


This menu has the following options:

20.5.1 Default Call Priority

This Indicates the priority level of a call (before transmission begins). This field is editable.

20.5.2 Transmit Demand Priority



There are 4 options associated with this field entry and are selected by clicking the pointer in the field value box and selecting an option using the down arrow.

The selected entry defines the level of priority used by the terminal to send transmit requests (Group Call or Express Group Call only).

Note: This parameter may be ignored by the system.

The available levels are:

- Low Demand Priority.
- High Demand Priority.
- Pre-emptive Demand Priority.
- Emergency Pre-emptive Demand Priority (This is priority 15 and will not interrupt emergency calls).

Selecting “Pre-emptive Demand Priority” enables the pre-emption (interrupt) of a user on another call that has a lower priority.

20.5.3 Transmit Demand Private Priority

This entry determines the level of priority that the terminal will use for call set up of Semi-duplex Private Calls.

There are 3 options associated with this field entry and are selected by clicking the pointer in the field value box and selecting an option using the down arrow.

The available levels are:

- Low Demand Priority
- High Demand Priority
- Pre-emptive Demand Priority

Selecting “Pre-emptive Demand Priority” enables the pre-emption (interrupt) of a user on another call.

Note: This parameter may be ignored by the system.

20.5.4 PSTN Gateway ID

This field displays the System Identity (ISSI) of the PSTN Gateway that is used to access the telephone interface for telephone call set up to a PSTN. Selecting the reset option will display the TETRA Standard ISSI.

20.5.5 PABX Gateway ID

This field displays the System Identity (ISSI) of the PABX Gateway that is used to access the telephone interface for telephone call set up to a PABX. Selecting the reset option will display the TETRA Standard ISSI.

20.5.6 PTT ID

Selecting this feature allows the ID of the terminal to be displayed at receiving terminals during Group Calls (Express Group Call) and Private Calls (Express Connect Call).

20.5.7 Busy Override

During group call set up, the user may receive a busy indication from the system and although the critical sites are busy and cannot support the Group Call, the user is allowed to request to transmit the Group Call in the available sites.

To enable this option check the box.

20.5.8 Announcement Talkgroup Enable

An announcement call (also called multi-group call) is a special type of group call. It provides the capability for the dispatcher or a terminal user to communicate with more than one talkgroup at the same time.

A number of talkgroups are associated with an announcement talkgroup (ATG) so that when a call is initiated to the ATG, all members of the associated talkgroups can receive the call. Each talkgroup may have one associated ATG that it monitors (in addition to the selected talkgroup and the scan list if activated).

An ATG has the highest priority level, thus enabling broadcast of the call to all these talkgroups.

Activation and deactivation of talkgroup scanning has no effect on the ATG scan list. The phone will always monitor the ATG scan list.

This feature is Enabled/Disabled by clicking in the check box.

20.5.9 PTT Calls Back Displayed Party

If enabled, the user is able of return a voice call to the sender of a message or to any number that is embedded in the message text.

Check box to enable this feature.

20.5.10 Transmission Timeout Timer

The entry in this field defines the period of time in seconds, that the user can PTT and talk during a Private call. After this time the terminal will stop transmitting even though the PTT button is still pressed.

The range for this option is 1 - 300 seconds and the default is 60 seconds.

20.5.11 Transmission Timeout Warning Timer

This field is a none editable and is related to the value set in the Transmission Time Out Timer field. It defines the time in seconds, after which the terminal will alert the user prior to the expiry of the Transmission Time Out Timer.

20.5.12 PTT Call Back Timer

Upon initiating a call, if the terminal’s user is not holding down the PTT when the network grants transmit permission, the user shall be given this much time to begin transmitting before transmit permission is rescinded.

The range for this option is 100 - 3000 seconds and the default is 3000 seconds.

20.5.13 PTT Call Back Timer Enabled

This feature is Enabled/Disabled by clicking in the check box.

20.5.14 PTT during received Group Call

This feature determines whether the user has the possibility to PTT during an ongoing Group Call.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

21 NGCH Parameters

Click to expand/collapse pages listing the NGCH parameters which are necessary to configure the control head.

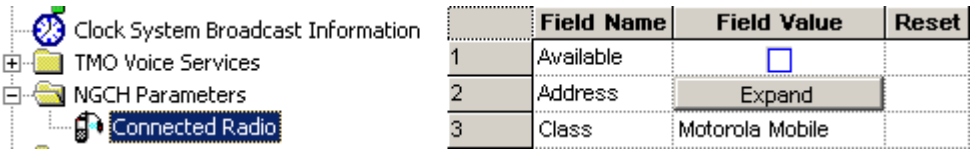
The Next Generation Control Head (NGCH) is a control head that provides an interface between the user and radio, consistent with other Motorola portable radios. In addition, it introduces a number of new features like GCAI accessories, GPIO on the control head and USB connectivity.

21.1 User Test Enabled

Defines if the user test mode is available in the NGCH device.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

21.2 Connected Radio



21.2.1 Available

Defines if the radios are connected to the control head.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

21.2.2 Address

Defines the address of all connected radios.

Click on the Expand/Collapse button to see or hide the address.

21.2.3 Class

Defines the device class of all connected radios.

There are 3 classes to choose from:

- Motorola Portable - refers to devices like MTH800 or MTP850 containing software that supports NGCH.
- Motorola Mobile - refers to devices like MTM800 containing software that supports NGCH.
- 3rd party - refers to device from another vendor which supports NGCH.

To choose the setting, put the pointer into the field value, click on the arrow, and drag the pointer to the desired selection.

22 DMO Parameters

Related field is:

Paragraph 14.6 "Direct Mode (DMO)"

Paragraph 14.7 "Direct Mode (DMO) Reservation"

Paragraph 31.3 "One-Touch Options"

Paragraph 31.4 "One Touch Buttons"

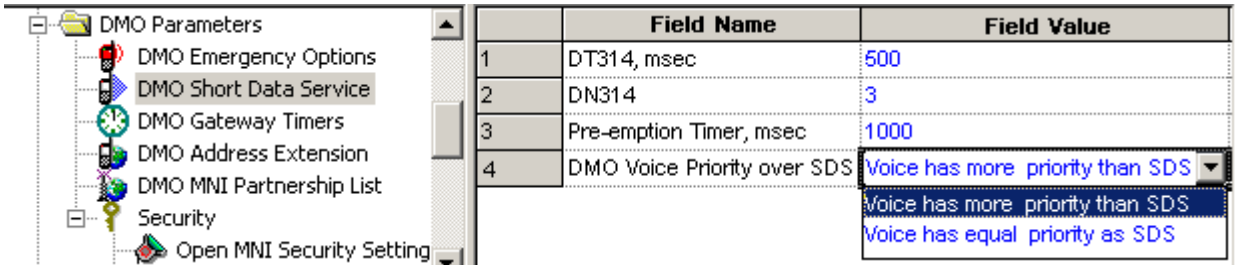
This menu is used to set the parameters for Direct Mode Operation (DMO). When in DMO, the terminal acts like a normal 2 way terminal and is not logged on to the system.

22.1 DMO Emergency Options

Emergency Alarm parameter indicates whether the emergency alarm feature is enabled or disabled in DMO.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

22.2 DMO Short Data Service



This sub menu lists all the parameters related to the DMO Short Data Service feature.

It has the following options:

22.2.1 DT314

This entry defines time-out in miliseconds for reporting SDS failure after sending DM-PRE ACCEPT.

22.2.2 DN314

The entry in this field is a number of transmissions of unacknowledged DM-SDS UDATA packet data unit (PDU).

22.2.3 Pre-emption Timer

This is the maximum time to wait for pre-emption response (DM-PRE ACCEPT or DM-REJECT). Type in the required value.

22.2.4 DMO Voice Priority over SDS

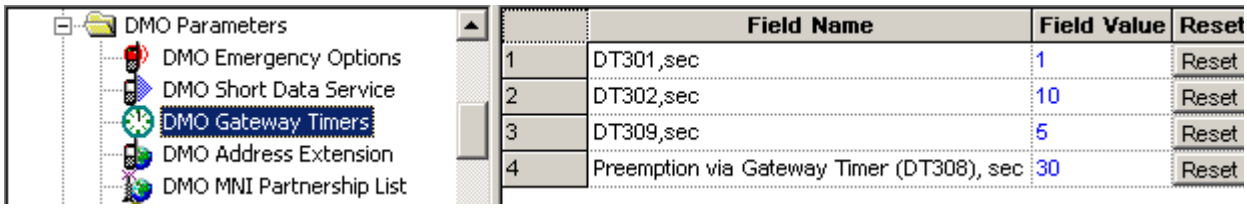
Determines if DMO Voice has more or equal priority compared to DMO SDS and Status.

The options are:

- Voice has more priority than SDS
- Voice has equal priority as SDS.

To select the option, put the pointer into the field value, click on the arrow, and drag the pointer to the desired option.

22.3 DMO Gateway Timers



A DMO Gateway is equipment that can fulfill two rolls:

1. It acts as a repeater allowing calls between terminals from both the same and different systems.
2. It also enables system access to terminals in DMO.

A gateway may be installed at a site outside of a cell coverage area to provide extended coverage for that cell in a particular direction.

This sub menu has the following options:

22.3.1 DT301

This entry defines the time that the terminal will wait for a response from a DMO Gateway to a DMO Gateway set up (BM-GSETUP) request message before timing out.

The range for this timer is 0 - 30 seconds.

The default is 1second.

22.3.2 DT302

The entry in this field defines the time in seconds that the terminal will wait to be connected after receiving a Gateway acknowledgement (DM-GACK) to a call set up request before timing out.

The range for this timer is 10 - 60 seconds. The default is 10 seconds.

22.3.3 DT309

The entry in this field defines the time in seconds that the terminal will wait, after receiving a DM_GACK, for a Gateway Transmit Accept (DM-GTXACCEPT) message before timing out.

The range for this timer is 5- 30 seconds. The default is 5 seconds.

22.3.4 DT308, Pre-emption via Gateway Timer

The entry in this field defines the time in seconds that the terminal will wait, after receiving a DM_GACK, for a Gateway Pre-emption Accept message (DM-GPRE ACCEPT) before timing out.

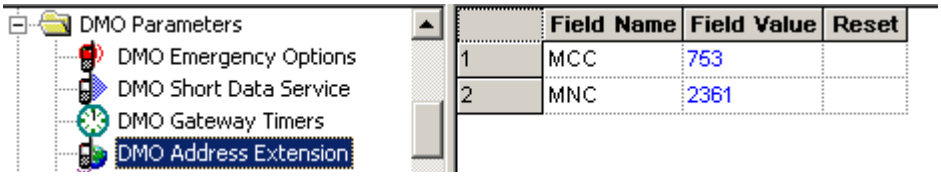
Pre-requisite for this option is that “Initiate pre-emption in ongoing call” is supported by the terminal.

The range for this timer is 10 - 60 seconds.

The default is 30 seconds.

Note: Selecting the reset option for each of the above timers will enter the factory default setting in the Field Value box.

22.4 DMO Address Extension



The 2 entries in this sub menu are used to identify the DMO Gateway on which the terminal can operate. As an example, adjacent regional police forces have their own separate Tetra systems and are using Gateways. By having the same entries for these fields in all the gateways, subscribers from both systems are then able to communicate with each other.

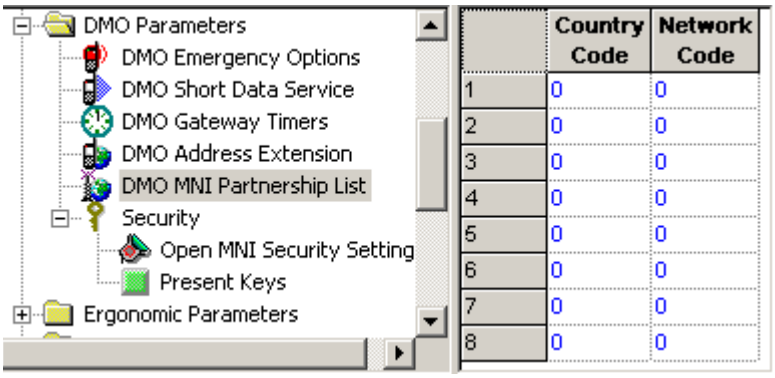
22.4.1 MCC

The entry in this field defines the country code for the country in which the gateway is operating.

22.4.2 MNC

The entry in this field defines the system operating (licence number) number obtained from the in country licensing authority.

22.5 DMO MNI Partnership List



This is basically an inter-operability table that provides backward compatibility allowing generation one terminals to talk to generation two (and upwards) terminals. Without this table, call would be receive only.

The list can contain up to 8 home MNIs that can be used when the terminal is in DMO. The Country Code entries must be in the range of 0-999.

The Network Code entries must be in the range of 0 -16383.

Gateways that are shared by networks enable terminals to call terminals from another network if the terminals are in DMO.

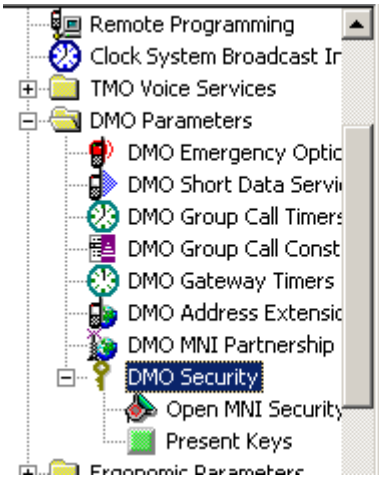
Inter-MNI, Intra-MNI: A call is intra-MNI if the MNIs of the calling and called party are the same. Otherwise it is inter-MNI.

The terminal conducts an inter-MNI call if:

1. The terminal initiates of a call to a foreign MNI
2. The terminal joins a call addressed to a foreign MNI (e.g. open MNI).

That is, reception of a call from an terminal of a foreign network addressed to the home network of the terminal is not an inter-MNI call for the called party. Such a call, though inter-MNI for the calling party, is considered intra-MNI by the called party.

22.6 DMO Security



	Field Name	Field Value	Reset
1	Key Grouping Method	<10K,3E>	
2	Default Key Group	NO_KG	
3	Default Incoming Minimum Security Class	Security Class 1	
4	Default Outgoing Security Class	Security Class 1	
5	Gateway Capabilities Class 2A	☑	
6	Gateway Capabilities Class 2B	☑	
7	Gateway Capabilities Class 2C	☑	
8	Repeater Capabilities Class 2A	☑	
9	Repeater Capabilities Class 2B	☑	
10	Repeater Capabilities Class 2C	☑	
11	Permit Clear Preemption in 2A / 2B	☐	
12	Active SCK Subset Number flag with OTAR	☐	

22.6.1 Key Grouping Method

Stores the key group method currently in use.

The notation <K,E> means that out of the 30 static cipher keys (SCKs) stored in the MS, SCK1-SCK-K*E are usable. The SCKs are split to *K* key-groups, each with *E* key-editions. Key-groups are labelled KG1 to KG-K, and *KGj* is composed of SCKs *j, j+K, j+2K, ..., j+(E-1)*K*.

The possible 10 values are: <30K,1E> <15K,2E> <10K,3E> <7K,4E> <6K,5E> <5K,6E> <4K,7E> <3K,10E> <2K,15E> <1K,30E>.

22.6.2 Default Key Group

This the default Key Group which applies for Individual communications. When key grouping method is <K, E>, the available values that can be selected are one of KGj(j=1 ... K) or NO_KG.

22.6.3 Default Incoming Minimum Security Class

This is an additional parameter to DMO talkgroups. It is the default minimum security class for calls and SDS messages reception. It applies to individually addressed communications as well as group addressed communications that are not covered in Incoming Minimum Security Class.

- Security Class 1 - no encryption applied.
- Security Class 2A - the DM-SDU and any related traffic are AI encrypted.
- Security Class 2B - the destination address (SSI), DM-SDU and any related traffic are AI encrypted.
- Security Class 2C - PDU encrypted from destination address element and onwards except for source address type element, and any related traffic are AI encrypted.

To change the setting, select the field value, and select desired setting.

Note: The Default Incoming Minimum Security Class cannot be set higher than the Default Outgoing Security Class.

22.6.4 Default Outgoing Security Class

This is an additional parameter to DMO talkgroups. It is the default security class for calls and sending SDS messages initiation. It applies to individually addressed destinations as well as group addressed destinations that are not covered in Outgoing Security Class.

The security classes are the same as for Default Incoming Minimum Security Class.

To change the setting, select the field value, and select desired setting.

Note: The Default Outgoing Security Class cannot be set lower than the Default Incoming Minimum Security Class.

22.6.5 Gateway Capabilities Class 2A - 2C

Click to activate/deactivate Boolean flag indicating if the radio shall assume that the relevant security class is supported by the gateway(s) in operation, or not supported by them.

By default the parameter is enabled.

22.6.6 Repeater Capabilities Class 2A - 2C

Click to activate/deactivate Boolean flag indicating if the radio shall assume that the relevant security class is supported by the repeater(s) in operation, or not supported by them.

22.6.7 Permit Clear Preemption in 2A / 2B

Click to activate/deactivate Boolean flag indicating if calls in security classes 2A/2B may be preemted in clear.

22.6.8 Active SCK Subset Number flag with OTAR

Indicates if the user is allowed to set the active SCK Subset Number while the DM-SCKs are managed by system via the Over-The-Air-Rekeying (OTAR).

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

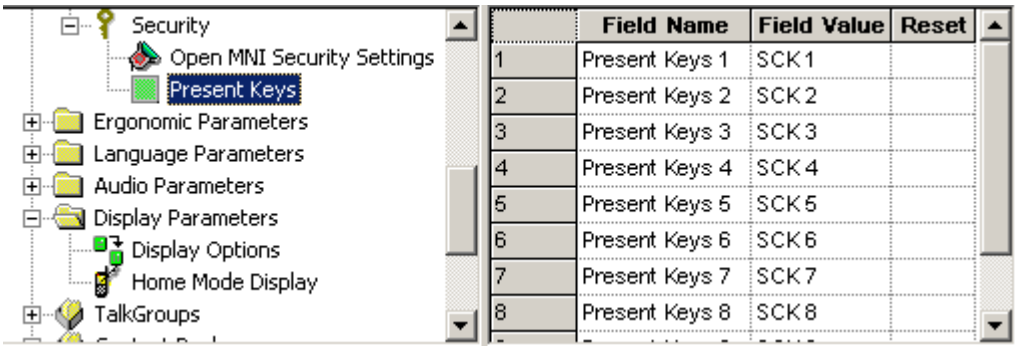
22.6.9 Open MNI Security settings

Click to display a table that provides security settings for open group calls which are identified by the MNI value.

Network MCC	Network MNC	Status	Key Group	Incoming Call Minimum Security Class	Outgoing Call Security Class
1023	16383	☑	NO_KG	Security Class 1	Security Class 1
753	2361	☑	NO_KG	Security Class 1	Security Class 1
0	0	☐	NO_KG	Security Class 1	Security Class 1
0	0	☐	NO_KG	Security Class 1	Security Class 1
0	0	☐	NO_KG	Security Class 1	Security Class 1
0	0	☐	NO_KG	Security Class 1	Security Class 1
0	0	☐	NO_KG	Security Class 1	Security Class 1

22.6.10 Present Keys

Click to display a table that stores for every key-group one SCKN which is the present key edition of that key group.



When key grouping methods is <K,E> (except for <30K,1E>) the table shall contain exactly K entries and each entry represents a key-group KGj j=1…K. For each key-group KGj (j=1…K) one of the E SCKNs of this key group can be selected. The list of SCKNs for each key-group is preset (i.e. the SCKN number cannot be typed). Each key-group is composed of SCKs j, j+K, j+2K, …, j+(E – 1)*K.

When the current pattern is <30K, 1E> every key group KGj has a single edition SCKj which is the present edition. Therefore the table may not exist (or shall not be editable).

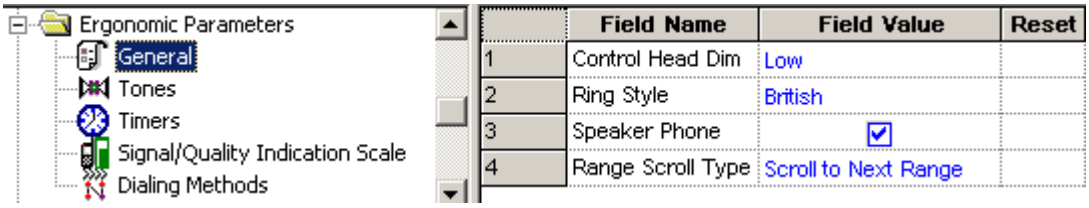
For example - when the current pattern is <10K,3E>, the present key of KG7 can be one of SCK7, SCK17 or SCK27, and similarly for all key groups KG1 KG2 … KG10.

23 Ergonomic Parameters

This has the following sub menus:

- General
- Tones
- Timers
- Signal/Quality Indication Scale
- Dialing Methods

23.1 General



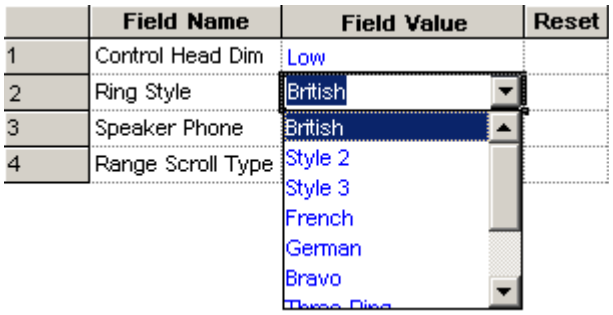
There are the following options in this sub menu.

23.1.1 Control Head Dim

This option is used to set the backlight brightness level of the mobile display and has the following options:

- Off
- Low
- Medium
- High

23.1.2 Ring Style



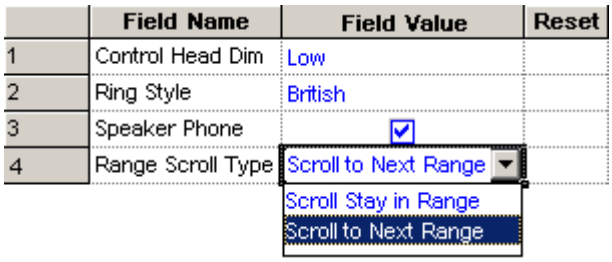
This field is used to set the ring style of the terminal. There are 9 available options, selectable by clicking the pointer in the field value box, clicking on the down arrow to display the options, use the scroll bar to scroll the options list and select an option by clicking the pointer on the required option.

23.1.3 Speaker Phone

This option defines whether or not received audio is heard through the terminals loudspeaker instead of the terminal's earpiece.

This feature is Enabled/Disabled by clicking in the check box.

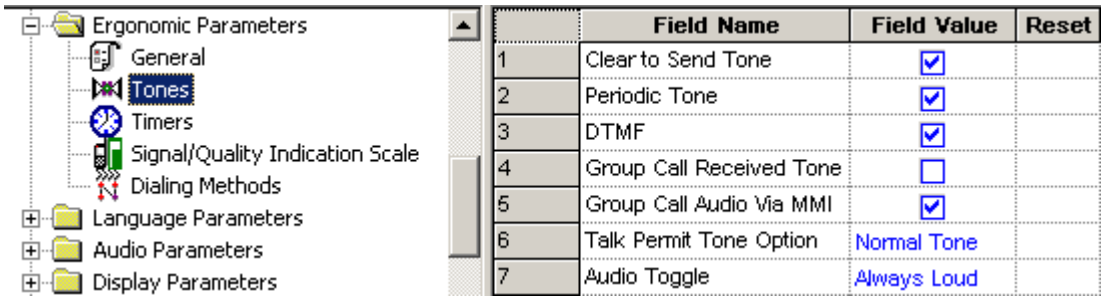
23.1.4 Range Scroll Type



This option defines whether the terminal will continually scroll the talkgroups of all the ranges, or will loop back within the same range and to change ranges, the user will have to manually select the required range via the terminal's menu functionality or pre-programmed button option.

Click the pointer on the down arrow to display the options and select an option by clicking the pointer on the required option.

23.2 Tones



There are 7 available options in this sub menu when the CPS is opened with the 'Admin Login'.

The tones relate to specific terminal actions undertaken as part of the MMI.

23.2.1 Clear to Send Tone

If enabled, the called terminal(s) will hear a short beep during a Group Call (Express Group Call) or a Private Call (Express Connect Call) when the user releases the PTT.

This feature is Enabled/Disabled by clicking in the check box.

23.2.2 Periodic Tone

If enabled, the terminal will sound a tone periodically when in a non-operational state i.e. no service.

This feature is Enabled/Disabled by clicking in the check box.

23.2.3 DTMF

If enabled, the keypad will change from an alphanumeric keypad to a DTMF keypad when the terminal is in either Phone or PABX mode. The user is then able to send DTMF tones, an option required for over dialing.

This feature is Enabled/Disabled by clicking in the check box.

23.2.4 Group Call Received Tone

If enable the received Group Call Alert will sound.

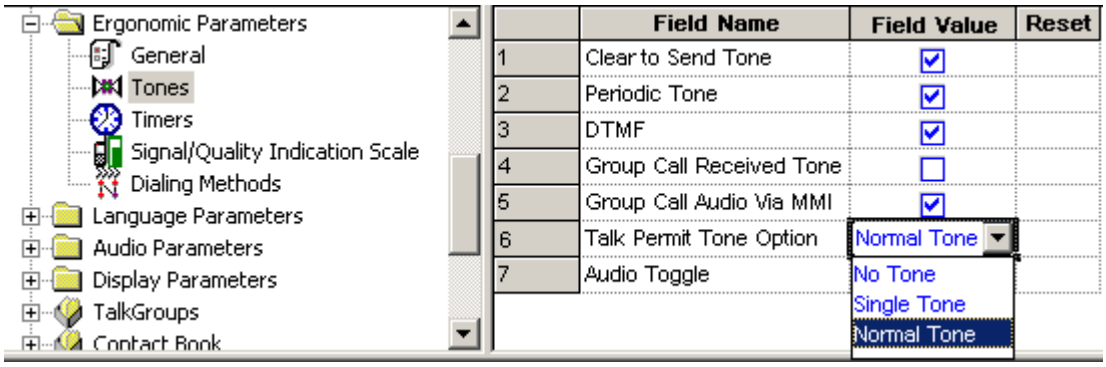
This feature is Enabled/Disabled by clicking in the check box.

23.2.5 Group Call Audio via MMI

Indicates whether the Group Audio sub-menu appears in the terminal's menu.

This feature is Enabled/Disabled by clicking in the check box.

23.2.6 Talk Permit Tone Option



The 3 available options are used to define the duration of the Talk Permit Tone when the user presses the PTT button. The tone indicates to the user that the terminal is in transmit mode and can talk.

23.2.6.1 No Tone

Note: If this option is selected and the terminal's 'Talk Permission' is delayed a number of seconds, due to heavy system traffic (such as a large-scale emergency situation), the first part of the message would not be sent if the user is accustomed to speaking immediately on pressing the PTT button.

23.2.6.2 Single tone

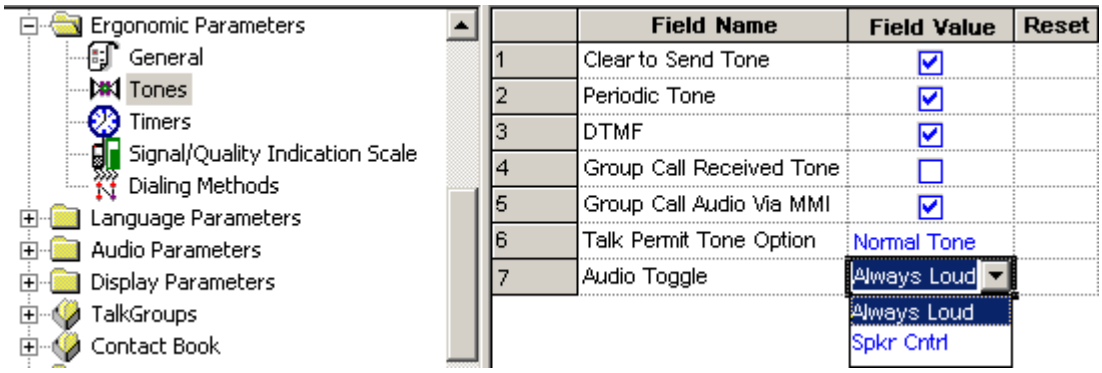
A single tone is heard upon pressing the PTT.

23.2.6.3 Normal tone

The factory-default tone heard upon pressing the PTT.

To select an option, place the pointer into the field, click on the arrow and drag the pointer to the desired option.

23.2.7 Audio Toggle

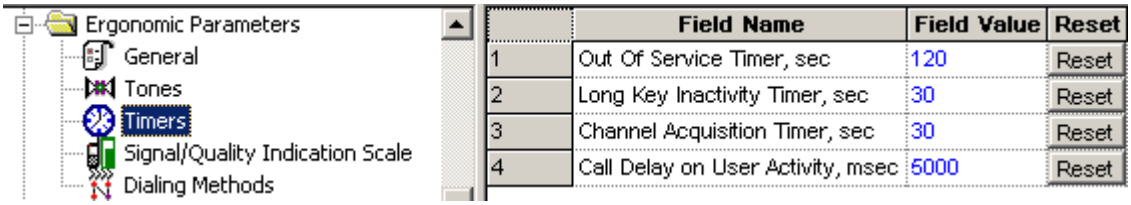


This field defines whether or not the “Loud/Low” audio soft key is displayed on the terminal screen during an active group call.

Selecting ‘Always Loud’ will direct the audio to the speaker for the call duration and the soft key will not be visible.

Selecting ‘Spkr Cntrl’ will display the soft key for user control, allowing the user to direct the audio to either the earpiece or the main speaker for the duration of call.

23.3 Timers



There are four available options in this sub menu. the timers can be set to the factory default by selecting ‘Reset’ or the user can enter a time in seconds.

23.3.1 Out of Service Timer, sec

This entry defines the period of time in seconds after which the phone will alert the user that it is out of service. The alert is repeated at this time interval until it regains service.

The range of this time period is 0 - 900 seconds, the default setting is 120 seconds.

The timer is disabled when set to zero.

23.3.2 Long Key Inactivity Timer

This timer defines the time duration of no user input/activity, i.e. a button press, after which the terminal will return to its default mode.

The range setting for this timer is from 0 - 60 seconds and is disabled when the field entry is set to 0 (zero). The default setting is 30 seconds,

23.3.3 Channel Acquisition Timer

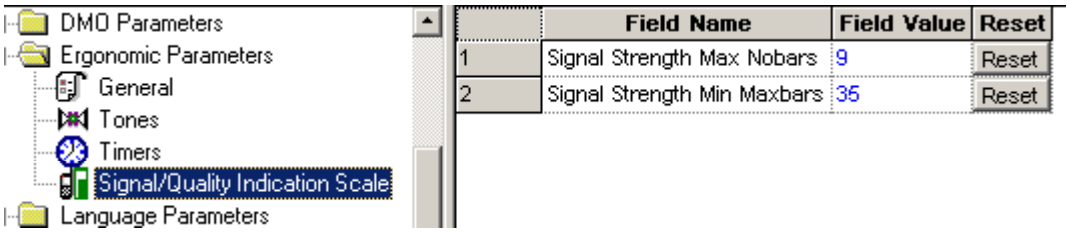
This is the period of time the phone waits before it advises the user it is out of service, not attached, or is in local area service.

The range for this timer is 0 - 300 seconds, the default setting is 30 seconds.

23.3.4 Call Delay on User Activity

This field defines the amount of time after a user action during which all incoming (non-emergency) group calls are ignored (not joined).

23.4 Signal/Quality Indication Scale



These two fields are used for setting the number of bars that will be displayed to represent received signal strength.

23.4.1 Signal Strength Max Nobars

TMO/DMO dependent.

This field defines the maximum number of bars that will be displayed to indicate the **QUALITY** of the received signal in **TMO**, the bars are displayed to the left of the 'mast' icon and if the terminal looses coverage a warning is displayed and an alert sounded.

This field also defines the number of bars that will be displayed to indicate the **STRENGTH** of the received signal in **DMO**, the bars are displayed without the mast icon.

The range is from 0 - 127, the default being 9.

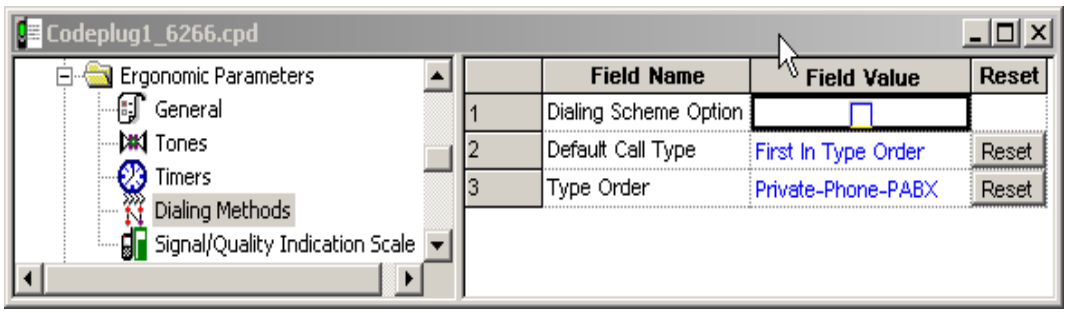
23.4.2 Signal Strength Min. Maxbars

This field defines the minimum number of bars that will be displayed to indicate the quality/strength of the received signal. These bars are displayed to the right of the 'mast' received signal strength icon.

The range is from 0 - 127, the default being 35.

This option defines the first call type that will appear on the idle display when the user starts dialing. The call type is one of the following: Private/Phone/PABX.

23.5 Dialing Methods



This menu option lists the dialing method parameters, which are a set of options that control the way the terminal behaves when the user dials a number.

23.5.1 Dialing Scheme Option

Indicates if the radio should use the dialing scheme. Radio's default setting is set to use the dialing scheme according to CPS configuration. When it is enabled, radio will use the CPS configuration but when it is disabled radio will use its own ISSI.

23.5.2 Default Call Type

Indicates the first call type that will appear on the idle display when the user starts dialing. The call type is one of the following calls: Private/Phone/PABX.

- First in Type Order: If this option is chosen, the first Call Type defined in the Type Order field will always be the first type offered to the user when he/she begins to dial.
- Last Active: If this option is chosen, the Call Type of the last active call will be the first type offered to the user when he/she begins to dial.

To change the setting, select the field value, and then select the desired option.

23.5.3 Type Order

Indicates the sequence in which the call types appear to the user when he/she presses on the 'CType' soft key.

To change the setting, select the field value, then select the desired option.

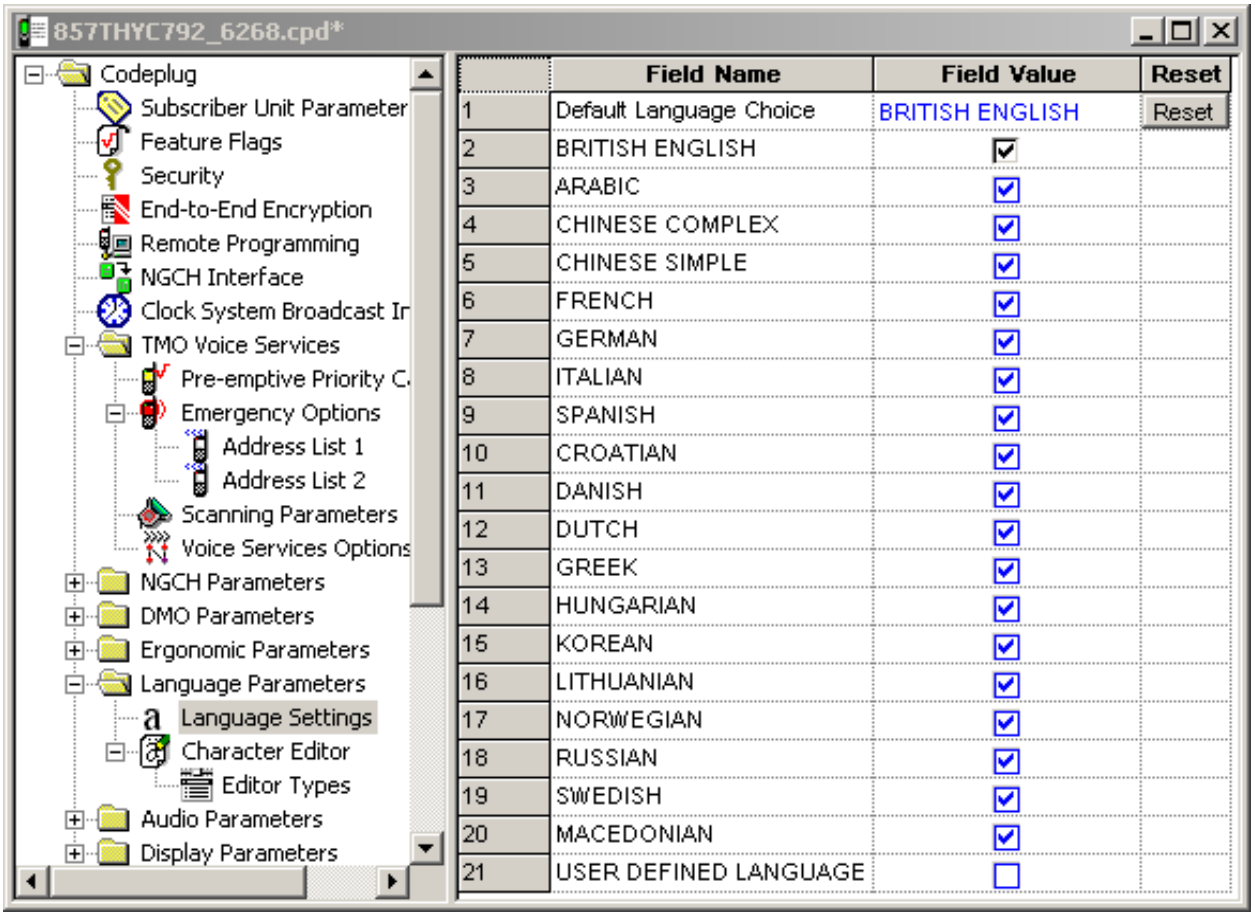
Related fields:

- For the Private call, one of the Private Call features needs to be enabled: half-duplex or full-duplex.
- For the Phone and PABX Call, the corresponding feature needs to be enabled.

24 Language Parameters

This menu has 2options that set the language used for the terminal's prompts, the first gives a choice from the standard options and the remaining options allow user entry for the prompts.

24.1 Language Settings



There are a possible 21 options including ‘User Defined’.

Select the check box for the required language.

Note: The options are restricted if the CPS is opened using the ‘User Login’.

24.2 Character Editor

The Character Editor is the feature used to create different types of editors in the radio.

The iTAP feature is a feature within the Character Editor, which enables to use a whole word predictive entry method when entering text in a character editor.

The TAP entry method is the regular entering of characters in a character editor.

The default entry methods and languages of the different applications using the Character Editor dialogue are stored in the codeplug.

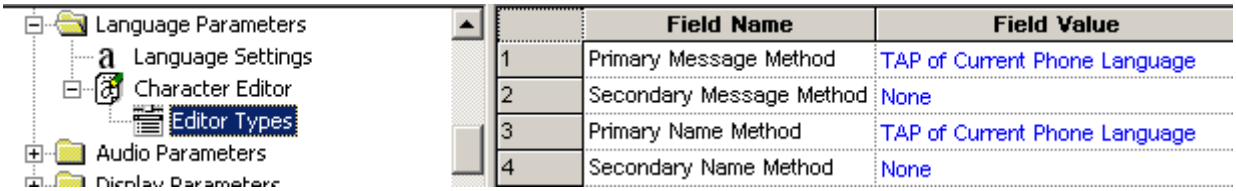
When the Character Editor screen is created by an application, the character type, which the application uses, is supplied.

For each group of character types, there is a respective parameter in the codeplug, in which the default entry method is saved.

This group of character types forms an editor type.

The terminal supports default primary and secondary entry methods via the codeplug for the different features, which use the Character Editor dialogue.

24.2.1 Editor Types



The default primary and secondary entry methods and languages for the Message Editor are stored in the primary message method and secondary message method.

When the primary and/or secondary entry methods are changed for a specific editor type, the new values are saved in the codeplug. These values are now the default values for this editor type.

Upon entering the character editor via a certain feature, the initial values of the primary and secondary entry methods will be taken by the terminal from the corresponding default parameters in the codeplug.

The default primary and secondary entry methods and languages for the Name Editor will be stored in primary name method and secondary name method.

When the primary and/or secondary entry methods are changed for a specific editor type, the new values are saved in the codeplug. These values are now the default values for this editor type.

Upon entering the character editor via a certain feature, the initial values of the primary and secondary entry methods will be taken by the terminal from the corresponding default parameters in the codeplug.

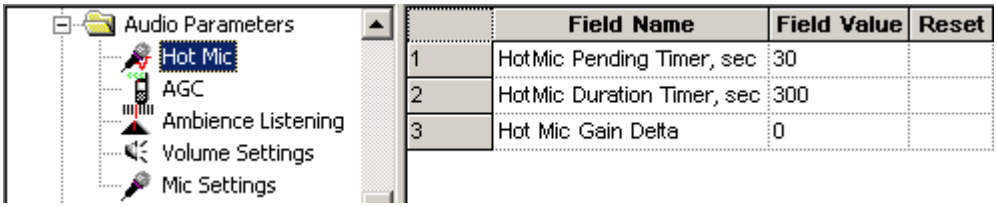
25 Audio Parameters

The following sub menus are available:

- Hot Mic
- AGC
- Ambience Listening
- Volume Settings
- Mic Settings

25.1 Hot Mic

The following screen shot shows the features available on the MTM800.



This sub menu has 3 editable options.

25.1.1 Hot Mic Pending Timer

This option is used to set the time during which the phone will try to get talk permit after entering Emergency Mode.

Timer range is 0 and 10 - 30 seconds, the default setting is 30 seconds

25.1.2 Hot Mic Duration Timer

This option is used to set the time period during which the phone has talk permission after entering Emergency Mode and the user is able to initiate an emergency group call without using the PTT button.

Timer range is 0 and 30 -1800 seconds, the default setting is 300 seconds

25.1.3 Hot Mic Gain Delta

This option is used to set the mic gain when the terminal enters emergency mode.

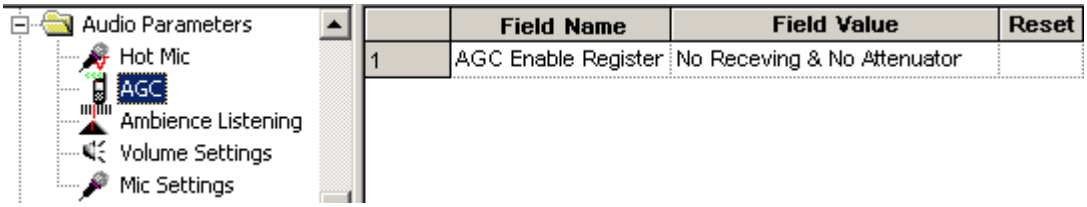
The levels are in dBs referenced to the normal mic gain setting

The selectable levels are:

- -3 – the gain is lower than the default gain of the microphone.
- 0 – the gain is the default gain of the microphone.
- 3 – the gain is higher than the default gain of the microphone.
- 6 – the highest gain value possible.

To select the required level, put the pointer into the field value, click on the arrow, and drag the pointer to the desired level.

25.2 AGC (Automatic Gain Control)

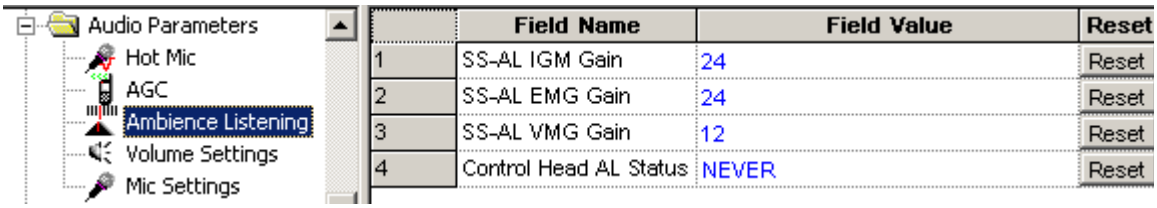


Automatic Gain Control (AGC) can be implemented in the following audio paths during private simplex calls. This feature, when enabled, will maintain a constant audio output level and has the following options:

- **No receiving and no attenuator**.

- **External Microphone 12 dB attenuator** - When this feature is enabled (only during private simplex calls), an Automatic Gain Control (AGC) is implemented in the microphone path in order to keep the active speech level at a certain reference power level.
- **Digital receiving AGC** - When this feature is enabled (only during private simplex calls), an Automatic Gain Control (AGC) is implemented in the receiver path in order to keep the active speech level at a certain reference power level.
- **Receiving and attenuator**.

25.3 Ambience Listening



This provides an authorised user (a dispatcher etc.) with the ability to cause a terminal to transmit, without giving any indication to the user, allowing any audio activity picked up by the terminal's microphone to be transmitted and monitored.

25.3.1 SS-AL IGM Gain

(Supplementary Services-Ambience Listening Internal Microphone Group).

This entry sets the gain of the terminal's internal microphone between -3 and 24 in steps of 3. The default is 24.

25.3.2 SS-AL EMG Gain

(Supplementary Services-Ambience Listening External Microphone Group)

This entry sets the gain of a microphone connected to the terminals accessory connector between -3 and 24 in steps of 3. The default is 24.

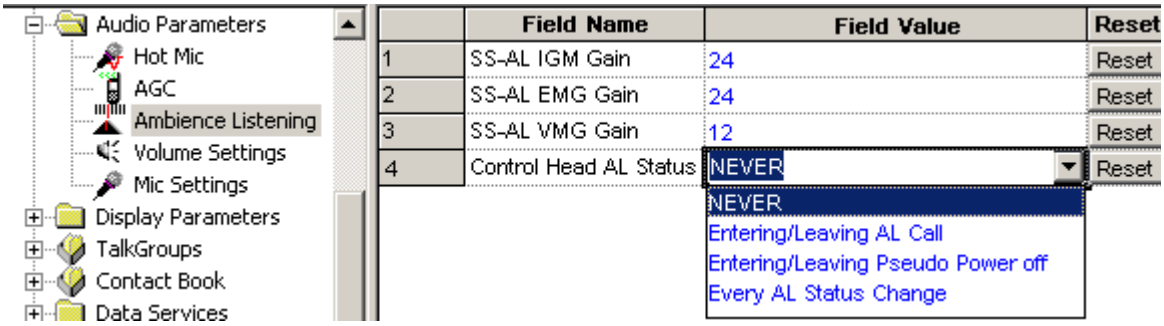
25.3.3 SS-AL VMG Gain

(Supplementary Services-Ambience Listening Vehicle Microphone Group)

This entry sets the gain of the microphone used with a vehicle mounting kit between -3 and 24 in steps of 3. The default is 12.

Note: All levels are in dBs relative to the microphone gain and may be different for each microphone type.

25.3.4 Control Head AL Status

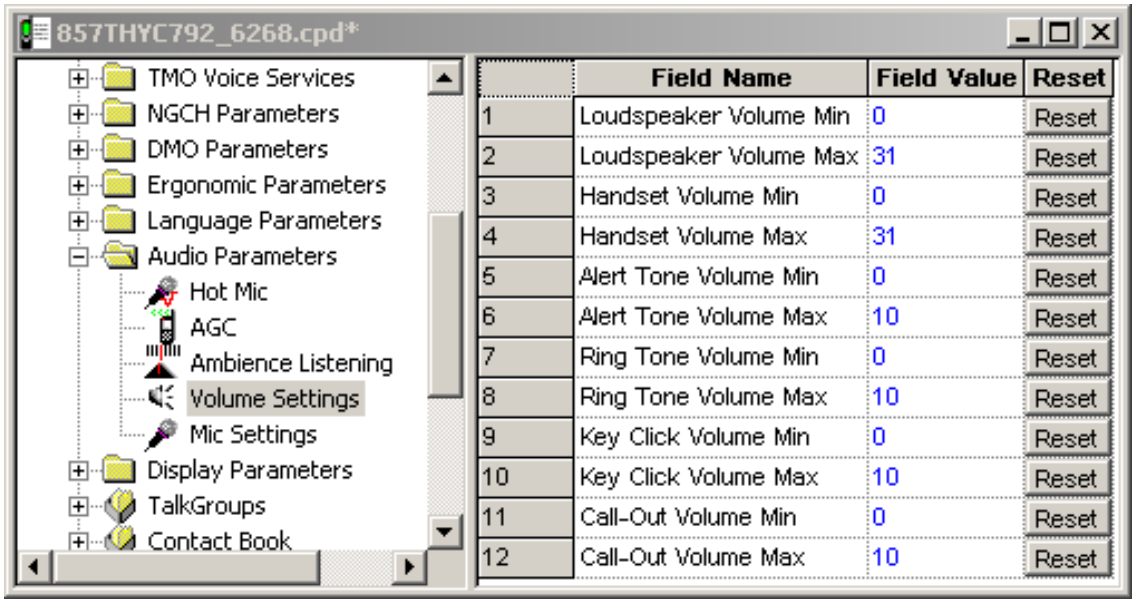


The Control Head is able to receive Ambience Listening Status notification (i.e.: uses SB9600 commands for AL call status notification) and has the following options:

- **Never** - the terminal will not send notifications to the control head.
- **Entering/Leaving AL Call** - the terminal will notify the control head when entering/leaving AL.
- **Entering/Leaving Pseudo power Off** - the terminal will notify the control head when entering/leaving Pseudo Power On/Off state.
- **Every AL Status Change** - the terminal will notify the control head at every AL status change.

To choose the level, put the pointer into the field value, click on the arrow, and drag the pointer to the desired level.

25.4 Volume Settings



These options control of the volume range for the 2 speakers and various kinds of audio.

There are 2 speakers - the handset speaker and the external loudspeaker.

The levels can be set in the range of 0 to 31 and the defaults are as shown above.

Note: The minimum value must be less than the maximum value. The maximum value must be greater than the minimum value.

Included Fields:

Loudspeaker - Displays the volume range of the alert tone heard in the external speaker.

Handset - Displays the volume range of the speech heard in the handset.

Alert Tone - Displays the volume range of the alert tone heard.

Ring Tone - Displays the volume range of the ringing heard when a telephone call arrives.

Key Click - Displays the volume range of the sound when the user presses a key.

25.5 Mic Settings

These options are used to control of the microphone gain for the front microphone (Standard Mic & Handset) and an external microphone connected via the accessory connector.

25.5.1 Standard Mic / Handset Gain

Allows adjustment of the microphone gain for the Standard Mic or the Handset connected to the front microphone connector of the control head.

The range for this is -0 to 31 and the default is 16.

Note: Please deviate from the default value only if absolutely necessary. Optimum radio performance is only provided with the delivered default settings.

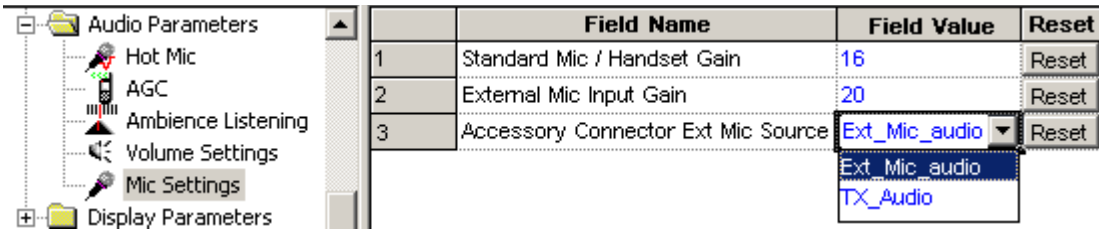
25.5.2 External Mic Input Gain

Allows adjustment of the microphone gain for the external microphone input at the accessory connector.

The range for this is -0 to 31 and the default is 20.

Note: Please deviate from the default value only if absolutely necessary. Optimum radio performance is only provided with the delivered default settings.

25.5.3 Accessory Connector Ext Mic Source



This is used to select the audio input to the terminal.

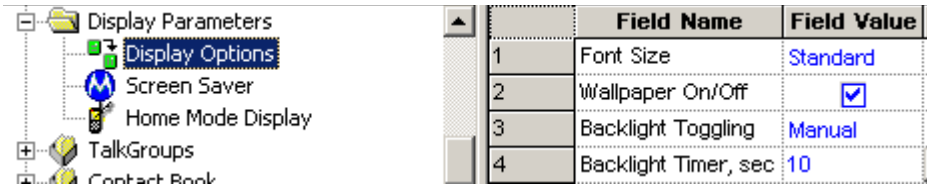
Ext_Mic_Audio - This selects the external mic audio from the externally connected mic. The DC impedance is 600 ohms and the AC impedance is 560 ohms.

Tx_Audio - This selects the audio from the control head mic. This has an impedance >10k ohms and an input level of 775mV rms.

26 Display Parameters

The options available within these sub menus are used for the terminal's display configuration.

26.1 Display Options



The available options in this sub menu are used to configure the appearance of the display.

26.1.1 Font Size

This menu option displays the last selected font size:

- Standard
- Zoom

To select the setting, select the field value, and then select the desired setting.

The user can change the setting via the menu.

26.1.2 Wallpaper On/Off

This menu option toggles the display wallpaper on or off. When the wallpaper isenabled a predefined background appears on the display.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

26.1.3 Backlight Toggling

Selecting the Field Value down arrow will display the following four options:

Disable - Selecting this option disables the display backlight.

Manual - If this option is selected, a button must be programmed for backlight control to enable the user to turn the backlight on/off.

Semi-Auto - If this feature is enabled, the backlight works both manually and automatically. A button must be programmed for backlight control. The user is able to turn the backlight on or off and if turned on manually the terminal will turn the backlight off after the backlight timer expires.

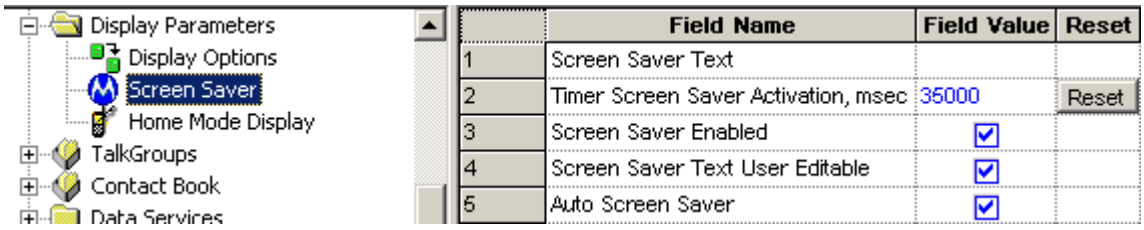
Auto - If this option is selected, the terminal will automatically turn the backlight on for button press and call reception and turn it off when the backlight timer expires.

26.1.4 Backlight Timer

This is the 'Auto' option timer and it defines how long the backlight will remain on, when the terminal has gone back to its normal standby state.

The range setting is from 1 to 30 seconds, the default setting is 10 seconds.

26.2 Screen Saver



Some models have 'screen saver' functionality. If enabled, it will consist of 2 elements, for example:

- A Police Force Logo, or similar graphics.
- An identifier

This enhances:

- Security by hiding sensitive information when the terminal is worn high on the chest at the lapel.
- Ease of identification by screen saver ID.

If configured, the user is able to edit the screen saver text.

Refer to the CPS help text on screen saver conversion.

26.2.1 Screen Saver Text

An alphanumeric text string of up to 12 characters can be entered in this field and will be displayed when the terminal is in its idle state.

26.2.2 Time Screen Saver Activation

This field is used to set the time, in msecs, after which the screen saver text message will be displayed. The range is 1000 - 216,000,000 msecs and the default is 35,000 msecs.

26.2.3 Screen Saver Enabled

This is a simple check box entry field that defines whether or not the screen saver is enabled. Use the mouse pointer and select the check box by pressing the left mouse button to enable/disable this option.

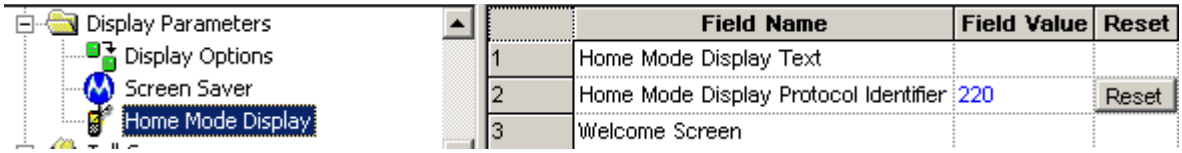
26.2.4 Screen Saver Text User Editable

This is a simple check box entry field that defines whether or not the user is able to edit the screen saver text message. Use the mouse pointer and select the check box by pressing the left mouse button to enable/disable this option.

26.2.5 Auto Screen Saver

If enabled, the screen saver will automatically be displayed after a default period of terminal inactivity.

26.3 Home Mode Display



This sub menu has the following four options that define the text displayed during the various stages of the terminal's power up and idle state.

26.3.1 Home Mode Display Text

An alphanumeric text string of up to 24 characters can be entered in this field and will be displayed when ever the terminal is in Home Mode.

26.3.2 Home Mode Display Protocol Identifier

The number in this field defines the message protocol used by the terminal to transmit and receive messages on the control channel when in Home Mode and enables the phone to identify the type of received message as a Home Mode Display message and take any necessary action.

Note: Protocol Identifiers. These define the action a terminal must take when a message is received. Some messages are displayed and others are actioned by the terminal, i.e. DGNA updates.

The range is from 0 to 255, the default is 220.

For more information see: ETSI EN300 392 - 2 Paragraph 29.4.3.9 Table 439.

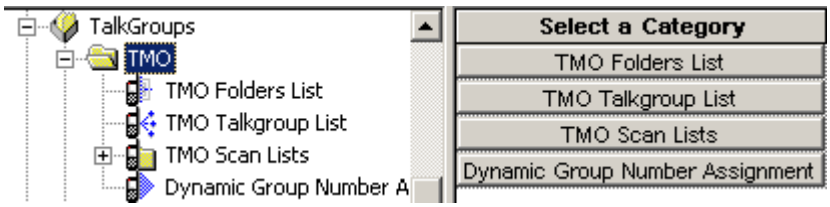
26.3.3 Welcome Screen

An alphanumeric text string of up to 28 characters can be entered in this field and will be displayed as the terminal powers up.

27 TalkGroups

This menu contains the TMO, DMO and My Favorite Groups sub menus that have the following options:

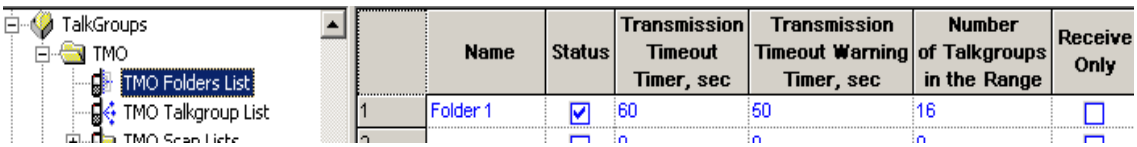
27.1 TMO (Trunked Mode Operation)



TMO now has the following sub menu options:

- TMO Folders List
- TMO Talkgroup List
- TMO Scan Lists
- Dynamic Group Number Assignment

27.1.1 TMO Folders List



The TMO Folder List contains up to 128 entries.

27.1.1.1 Name

This field can be programmed with up to 12 alphanumeric digits for the name/alias of the range.

27.1.1.2 Status

Select the check box to make an entry active. If an entry is not checked, it will not be displayed. A list can either be created manually or imported.

27.1.1.3 Transmission Time Out Timer

The entry in this field is the per range allowed call talk time. The time range is from 0 to 300 seconds.

27.1.1.4 Transmission time Out Warning Timer

Parameter controlling, per range, the time for generating <TOT Warning Tone> prior to <TOT> expires. The <TOT warning tone timer> shall be less than <TOT> setting.

The radio can continuously transmit until the <TOT Warning Tone timer> expired, then the phone will generate <TOT Warning Tone> to alert the user that transmission will soon be stopped.

The time can be set between 0 - 299 seconds.

27.1.1.5 Number of Talkgroups in the Range

The parameter indicates the maximum number of Talkgroups that can be programmed in the folder/ range.

The number of talkgroups can be set between 0-1024.

27.1.1.6 Receive Only

This is a per range setting and if the check box is selected, the user will be able to hear the calls, but will not able to set up group calls to any of the talkgroups in the range, or PTT during a call.

27.1.2 TMO Talkgroup List

Note: At least one entry field must remain empty if DGNA is to be used, see paragraph 12.1.5.

Note: Call-Out talkgroup is recommended to be set as Invisible.

27.1.2.1 Name

This field can be programmed with up to 12 alphanumeric digits for the name/alias of the group.

Up to 16 entries can be added to each range, giving a total of 2048 group entries.

27.1.2.2 ID

This is a Group Short Subscriber Identity (GSSI) of up to 8 digits and in the range 0 to 15,999,999 can be entered in this field to define the identity of the group.

Note: The same group(s) can be added to several/all ranges as required.

27.1.2.3 Status

Select a box to display the down arrow and choose from the available options. An entry can be enabled by selecting the ‘Programmed’ option, disabled and not seen by the user when the ‘Not Programmed option’ is selected, or if the ‘Invisible’ option is selected it will not be seen or be selectable by the user, but it can be added to a scan list via CPS programming.

27.1.2.4 Folders List

This field is an automatically filled read-only list. It lists the number of talkgroups in the range (done in TMO Folders List page).

27.1.2.5 Announce Group

An announcement call (also called multi-group call) is a special case of group call. It provides the capability for the dispatcher or the phone to communicate with more than one talkgroup at the same time.

Select the check box to enable this option

27.1.2.6 Start Announce Call

Select the check box to make an entry active. If an entry is not checked, the user is not allowed to initiate an announce call.

27.1.2.7 Associated Announce Group

If the talkgroup is not an ATG (announce talkgroup), this field indicates to which ATG the talkgroup is assigned.

27.1.2.8 Group Priority

The entry in this field determines the scanning priority of the talkgroup. If landed on a group, the terminal will discard this group call if, during background scanning, it lands on group with a higher priority. The four available options are:

- Low
- Medium
- High
- Always Scanned

27.1.2.9 GCK Number

Stores the association between a TMO talkgroup and a GCK. This parameter is repeated for every TMO talkgroup entry in the codeplug.

The range is from 0-65536131071.

27.1.2.10 DMO Mapping

The mapped DMO talkgroup is selectable and derived from the Talkgroup list.

You can associate a DMO talkgroup configuration to a TMO talkgroup configuration. This means that if you are on TMO talkgroup 3, for example, then you are not bound to use DMO talkgroup 3 should the user switch to DMO. In your DMO fleetmap, it's possible to associate any TMO talkgroup to ANY DMO talkgroup, so in this example you could make DMO talkgroup number 23 the relevant DMO talkgroup for TMO talkgroup number 3.

When copying DMO or TMO talkgroup list to another new codeplug, mapping will be lost. Use cloning to keep values.

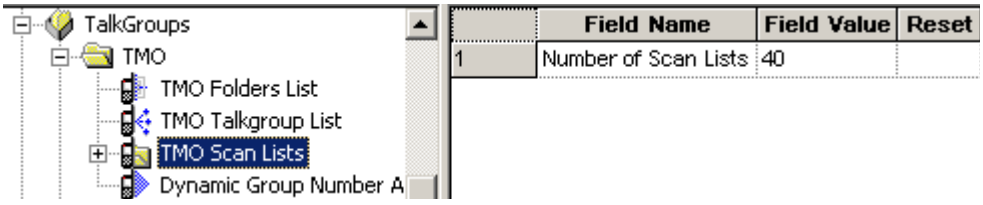
You cannot map a DMO talkgroup to an unprogrammed TMO talkgroup.

To select the correspondent DMO talkgroup, put the pointer into the field value, click on the arrow, and drag the pointer to the desired talkgroup.

27.1.2.11 Index

This column is non editable. Whenever a talkgroup is assigned as a one touch button option, the keypad number to which it is assigned will be displayed in this box.

27.1.3 TMO Scan Lists

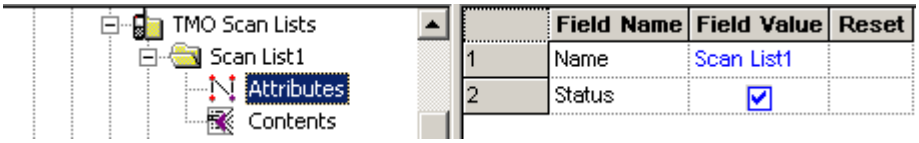


This sub menu contains 40 scan lists and each list may contain up to 20 entries. The lists can have identical entries if required.

27.1.3.1 Scan List 1

This has the following two options:

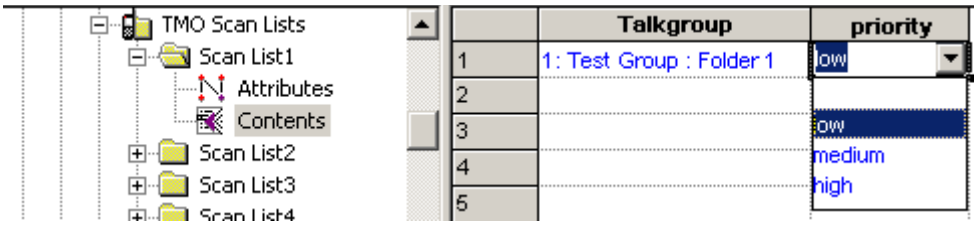
- **Attributes**



Name - a name or alias of up to 12 alphanumeric digits can be entered in the Field Value box of this category.

Status - Selecting the check box in the Field Value for the Status category will make the scan list active and selectable by user action.

- **Contents**



This has the following two options:

- **Talkgroup**

Using the mouse and clicking on a field will display a down arrow. Selected the arrow to display all the available talk group entries in the Talkgroup list, again using the mouse click on the required entry to add it to the scan list.

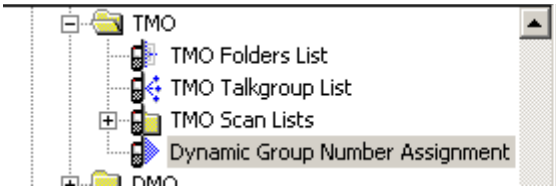
- **Priority**

This displays the talkgroup's priority level. An ongoing call, with a low priority, will be interrupted by a call from a high priority talkgroup. A call from a medium/low priority talkgroup will not interrupt the on-going call. After entering the Talkgroup field value, check the Priority field, select the now displayed down arrow to display the available groups and select the required option.

The available options are:

- Low
- Medium
- High

27.1.4 Dynamic Group Number Assignment



	Field Name	Field Value	Reset
1	DGNA Notification	☐	
2	Auto-Select Single Assigned Group	☐	
3	DGNA Folder Size	16	
4	DGNA Folder Prefix	Dynamic	

This has the following two options:

27.1.4.1 DGNA Notification

If this option is enabled by selecting the check box, the user will be alerted when the terminal receives an ‘Over the Air’ update to its talk group list.

27.1.4.2 Super Group of Scanned Groups Enabled

If enabled by checking the box, the terminal will scan the super group.

A super group has one GSSI, but is made up of several other groups. A call setup sequence addressed to the super group will also set the call up to the other groups within the super group.

Super groups are setup by system dispatchers/administrators and are part of the DGNA feature.

See Chapter 2 of the Product Information Manual, Paragraph "Group Addressed DGNA" for more information.

27.1.4.3 Auto Select Single Assigned Group

Indicates whether or not the terminal should automatically select a single assigned DGNA group.

Check the check box to Enable/Disable this option.

Using SS-DGNA, the SwMI may send a group assignment:

- to add a group or a number of groups to the terminal’s data base.
- to change the parameters or the attachment state of an existing group or groups in the terminal.

The assignment may require the terminal to immediately attach the group, change its Alias or Class of Usage or to just add it to the talkgroup list allowing it to be attached later.

The following requirements apply to each group element in the SS-DGNA Assign PDU. If there are multiple groups in the PDU, the acknowledge for all groups is sent together in one PDU.

For each assigned group, there is an assignment that is a command to add the group to the terminal’s group list, and may contain instructions to attach the group. The terminal can accept or reject the assignment. On accepting the assignment the terminal can either accept or reject the attachment.

Assignment with Auto-select

If Auto-Select Single Assigned Group is enabled, upon receipt of an individually addressed D-FACILITY PDU containing a DGNA assignment which contains a single group assignment without an attachment (that is, the Attachment Mode is set to Not Attached, MS user allowed to request attachment), the terminal processes the assignment as described above, and then automatically makes that group the selected group (that is ’auto-select’). Specifically, if this group had not already been the selected group before the assignment was received, the terminal shall send the group attachment for this group as if the user had manually chosen this group to be the selected group. The group shall remain the selected group until the user or the SwMI subsequently change the selected group.

Auto Reselect of Previous Group

When a group is auto-selected, and is then subsequently de-assigned or detached by the SwMI while the auto-select group is the currently selected group, the terminal automatically reselects the group previously selected by the user. However, if the user manually changed the selected group after auto-select and then subsequently reselected the auto-select group, or if there was never a user-selected group, the behaviour on de-assign of the group will be as the behaviour with any other group.

No Auto-select with Multiple Groups

If the terminal receives a D-FACILITY PDU containing DGNA assignments for more than one group, it will be treated as a normal DGNA assignment, and the auto-select parameter will have no effect on any of the groups.

No Select of Non-selectable

If the single assigned group already exists in the talkgroup list and is defined as non-selectable the terminal will not auto-select the group.

Assign Non-tactical Emergency Group

If an assignment for the group that is already defined in the codeplug as the non-tactical Emergency group is received, the terminal will update the name of the non-tactical group with the group name received in the assignment. The terminal will also treat this as a normal assignment and add the group to the talkgroup list or modify the parameters of the group if already in that list.

De-assign Non-tactical Emergency Group

If a de-assignment for the group that is defined as the non-tactical Emergency group is received, the terminal will remove it from the talkgroup list if it is also defined there, but it will remain as valid for use for non-tactical Emergency group calls.

Auto-select in Non-tactical Emergency Mode

If an assignment is received with Auto-Select Single Assigned Group (enabled) in Non-tactical Emergency Mode, the assignment will be accepted as normal, but auto-select will not be performed. Upon exiting from Emergency Mode, the terminal will select (and attach to) the last auto-select group received.

Auto-select Display

There will be a visible and audible notification to the user when auto select group is assigned or de-assigned, even if DGNA is disabled.

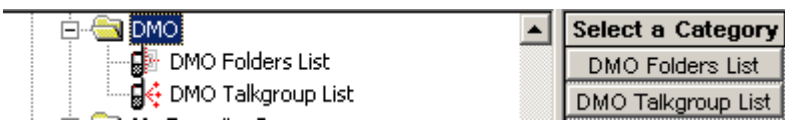
27.1.4.4 DGNA Folder Size

This defines how many entries can be placed into the folder. It can contain from 1 to 2048 entries.

27.1.4.5 DGNA Folder Prefix

This can contain up to 8 digits as a prefix (name) for the folder.

27.2 DMO (Direct Mode Operation)



Direct Mode Operation (DMO): When the terminal enters DMO it is no longer attached to a system and cannot receive calls (private, group, phone, Emergency or status and text messages) via the system.

The terminal is now acting as a 2 way terminal, emergency and group calls can be made to other terminals that are also in DMO mode, on the same group and within range.

This has the following two sub menus:

27.2.1 DMO Folders List

Name	Status	Transmission Timeout Timer, sec	Transmission Timeout Warning Timer, sec	Number of Talkgroups in the Range	Receive Only
DMO Folder1	☑	60	50	16	☐

The DMO range list and the TMO range list have the same functionality.

The DMO Range List can have up to 64 entries.

27.2.2 DMO Talkgroup List

The list can contain up to 1024 entries and each entry has up to 12 configurable options.

Note: Do Not duplicate DMO talkgroups in the terminal.

The columns Name, ID, Status, DMO Range List and TMO Mapping are similar to those in the TMO Talkgroup List, see Paragraph 27.1.2 "TMO Talkgroup List" for more information.

The other column options are:

Name	ID	Status	DMO Folders List	Communication Type	Gateway Selection	Gateway Address	Frequency Channel	Receive Call to DMO Partnership Networks	Network MCC	Net M
DMO TG 1	8388609	☑	1: DMO Fold	Direct	None		352.06250	User Define	753	2361

ay ss	Frequency Channel	Receive Call to DMO Partnership Networks	Network MCC	Network MNC	TMO Mapping	Key Group	Incoming Call Minimum Security Class	Outgoing Call Security Class
	352.06250	User Define	753	2361	1: Test Group : Folder 1	NO_	Security Class 1	Security Class 1

27.2.2.1 Communication Type

This has four options, selectable by first clicking in the field to display the down arrow and then selecting the down arrow to display the following options:

- **Direct** - this enables the user to communicate with other terminals operating in Direct Mode that are on the same frequency and talkgroup as the user.
- **Repeater** - this enables to support Direct Mode communications over a repeater.
- **Gateway** - the terminal is able to communicate with its trunking system (and vice-versa) if this option has been enabled, the system has Gateway connectivity and the terminal is able to communicate with the Gateway. A Gateway is used to extend the coverage of a cell by

allowing users to move out of the system's cell coverage area and use the gateway to remain in contact. Gateways are only used with terminals in DMO.

- **Repeater & Gateway** - depending on signal received the terminal uses the first available gateway or a DMO repeater.

27.2.2.2 Gateway Selection

This defaults to 'None' unless the Feature Flags/DMO Gateway option is selected, see Paragraph 14.20 "DMO Gateway" and Paragraph 27.2.2.1 "Communication Type"

It has the following 3 options:

- **None** - The terminal cannot use a Gateway
- **Specific** - the terminal will use a Gateway with the Gateway Address specified for this Talkgroup.
- **Automatic** - the terminal will use any Gateway it can find and to which it can connect.

27.2.2.3 Gateway Address

This is the specific address of the Gateway that the terminal will use, the MNI (Mobile Network Identity). The Gateways now have standard MCC & MNC codes and to prevent terminals accessing a different system, a specific address used for an own system gateway is entered in this field.

Note: Generation 1 terminals are not able to set up calls on a gateway, but if called by a terminal of at least Generation 2 build, the Generation 1 terminals are able to take an active part in the call, i.e. Tx & Rx.

27.2.2.4 Frequency Channel

This field specifies the frequency to be used for this DMO group, if no frequency is specified, the group will not be enabled.

27.2.2.5 Receive Call to DMO Partnership Networks

It is possible that different network providers will share Gateway access, thus allowing terminals of one system to access terminals of another system via a Gateway. These calls are referred to as Inter-MNI or Intra-MNI calls and are dependent upon the direction of the call.

- Inter-MNI (Mobile Network Identity - made up of the Country Code & ISSI) calls are calls between own system terminals via own system Gateway, or received calls, on own system Gateway, from a terminal of another system.
- Intra-MNI calls are calls to another system terminal via the other system Gateway.

Note: A terminal on its own Gateway is making Inter-MNI calls, a terminal using another system's gateway is making Intra-MNI calls.

An incoming group call addressed to MNIRCVD and SSIRCVD will be accepted by the terminal if:

- SSIRCVD (Short Subscriber Identity Received) equals the selected GSSI, and:
  i. SSIRCVD equals the group MNI, or
  ii. If SIM is not supported, the received call to partnership networks is YES and MNIRCVD exists in the DMO Partnership List.
- SSIRCVD = 11..112 and:
  i. MNIRCVD = 11..112, or
  ii. MNIRCVD = the Home MNI, or

iii. MNIRCVD = selected group MNI, or

iv. If SIM is not supported, the received call to partnership networks is YES and MNIRCVD exists in the DMO Partnership List.

27.2.2.6 Network MCC

This field defines the country code of the DMO Gateway.

27.2.2.7 Network MNC

This field defines the network code of the DMO Gateway.

27.2.2.8 TMO Mapping

Mapping between DMO and TMO talkgroups. The mapped TMO talkgroup is selectable and derived from the Talkgroup list.

It's possible to associate a DMO talkgroup configuration to a TMO talkgroup configuration. This means that if you are on TMO talkgroup 3, for example, then you are not bound to use DMO talkgroup 3 should the user switch to DMO. In your DMO fleetmap, it's possible to associate any TMO talkgroup to ANY DMO talkgroup, so in this example you could make DMO talkgroup number 23 the relevant DMO talkgroup for TMO talkgroup number 3.

When copying DMO or TMO talkgroup list to another new codeplug, mapping will be lost. Use cloning to keep values.

You cannot map a DMO talkgroup to an unprogrammed TMO talkgroup.

To select the correspondent TMO talkgroup, put the pointer into the field value, click on the arrow, and drag the pointer to the desired talk group.

27.2.2.9 Key Group

This is an additional parameter to DMO talkgroups. It specifies the key group associated with the destination address.

For each DMO group, when key grouping method is <K, E>, the available values that can be selected are one of KGj (j=1…K) or NO_KG.

27.2.2.10 Incoming Call Minimum Security Class

Specifies the minimum security class for call reception.

- Security Class 1 - no encryption applied.
- Security Class 2A - the DM-SDU and any related traffic are AI encrypted.
- Security Class 2B - the destination address (SSI), DM-SDU and any related traffic are AI encrypted.
- Security Class 2C - PDU encrypted from destination address element and onwards except for source address type element, and any related traffic are AI encrypted.

To change the setting, select the field value, and select desired setting.

27.2.2.11 Incoming Call Minimum Security Class

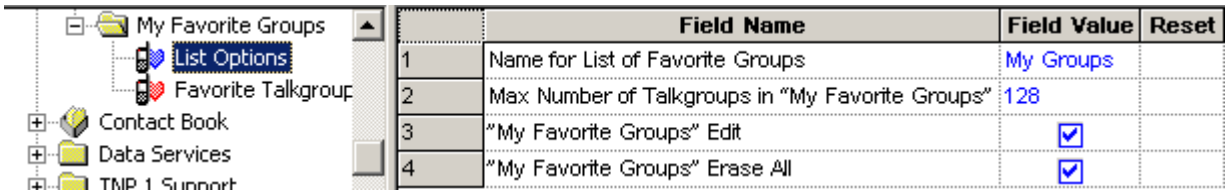
Specifies the minimum security class for call initiation.

See "Incoming Call Minimum Security Class" on page 105.

27.3 My Favorite Groups

This menu has the following two sub-menus:

27.3.1 List Options



This has the following options:

27.3.1.1 Name of List of Favorite Groups

A name or alias of up to 11 characters, used to identify this group range, is entered in the 'Field Value' window.

27.3.1.2 Maximum Number of Talkgroups in "My Favorite Groups"

This option defines the number of entries allowed in this list, up to 128 entries can be specified.

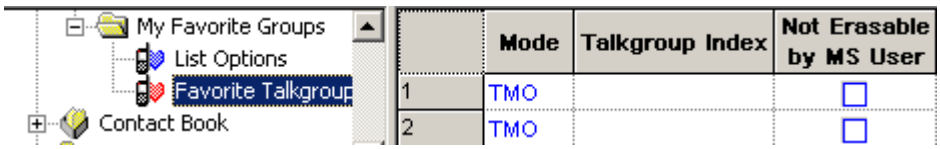
27.3.1.3 "My Favorite Groups" Edit

Selecting this option allows user to ADD groups to the list.

27.3.1.4 "My Favorite Groups" Erase All

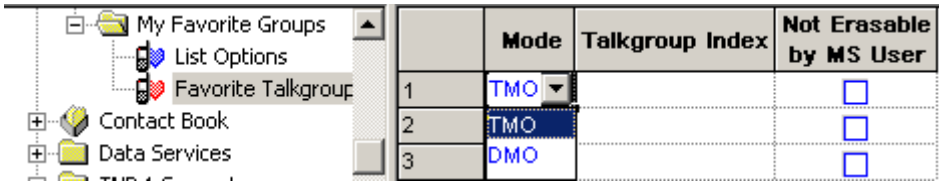
Selecting this option allows the user to remove groups from the list.

27.3.2 Favorite Talkgroups List



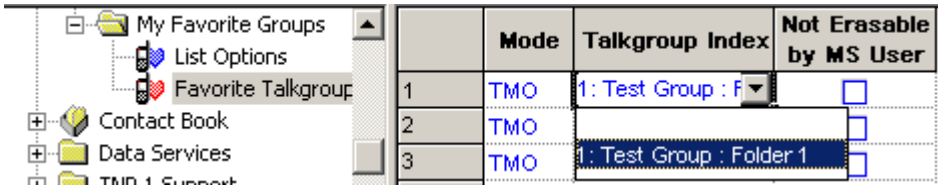
This list can have up to 128 entries with the following three options:

27.3.2.1 Mode



This field defines from which talk group list the entry is taken, the options are either TMO or DMO.

27.3.2.2 Talkgroup Index



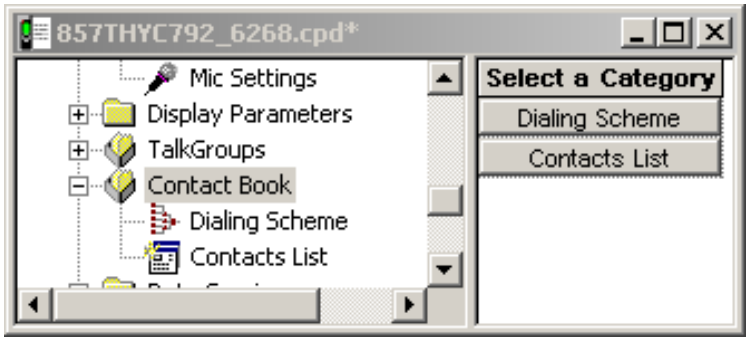
This option is used to define the talk group for this entry by clicking on its window, selecting the down arrow and choosing the entry from the displayed list of talk groups.

The displayed list is dependent upon the previously selected option for the Mode entry, it will be either the TMO or DMO talk group list.

27.3.2.3 Not Erasable by MS User

Checking the box in this field prevents the user from erasing the entry.

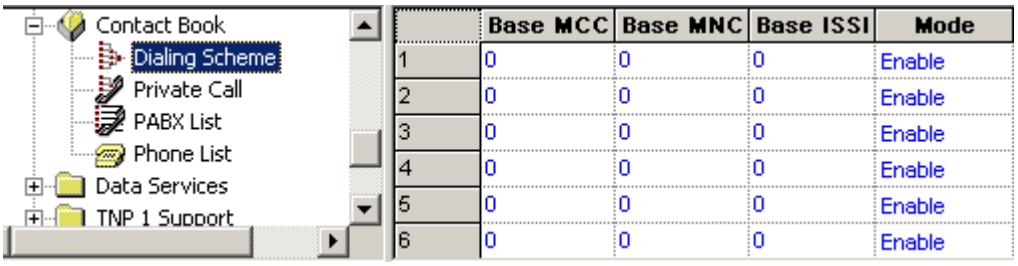
28 Contact Book



This has the following sub-menus:

- Dialing Scheme.
- Contacts List.

28.1 Dialing Scheme



	Base MCC	Base MNC	Base ISSI	Mode
1	0	0	0	Enable
2	0	0	0	Enable
3	0	0	0	Enable
4	0	0	0	Enable
5	0	0	0	Enable
6	0	0	0	Enable

This option is important for the successful entry of ISSIs into the Private Call list.

Note: The Dialing Scheme is only associated with Private Call.

This option specifies how the user enters the TETRA Identity:

- **Base MCC** - Enters an up to 3-digit number representing the (home) country of the phone.
- **Base MNC** - Enters an up to 5-digit number representing the (home) network operator within that country.
- **Base ISSI** - Enter the TETRA Identity.
- **Mode** - Enables or disables the Base ISSI field. To choose the mode, put the pointer into the field, click on the arrow, and drag the pointer to the desired setting: Enable or Disable.

Base ISSI in this context is the base address of individual addresses displayed to the user. When the user enters an individual address, the base address is added to the individual address before sending it over the air interface.

Similarly, when an individual address is received over the air interface, the base address is subtracted before displaying it to the user.

The service provider is given the flexibility to establish a different base address for a different number of digits entered by the user.

Examples:

If there are less than 1,000 phones in your fleet, the service provider may allow phones to address each other using only 3 digits, and their real address will use a 'fleet address' as a base address only if 3 digits or less are entered by the user.

If you want the user to enter exactly n digits, then set the Mode field of the nth entry to Enable. Enter in the Base ISSI field the first digits of the terminal ISSI, followed by zeros.

Say, your terminal ISSI is 4282123. You prefer to call the engineers outside your group by dialing 3 digits (i.e.: dialing 456 to call 4282456). Therefore, set the Mode field of Entry 3 to Enable. Enter 4282000 in the Base ISSI field.

The engineers inside your group have the following numbers: 4282100 - 4282199. You wish to call your group by dialing 2 digits. Therefore, set the Mode field of Entry 2 to Enable, and enter 4282100 in the Base ISSI field.

Thus:

dialing 89 will call 4282189

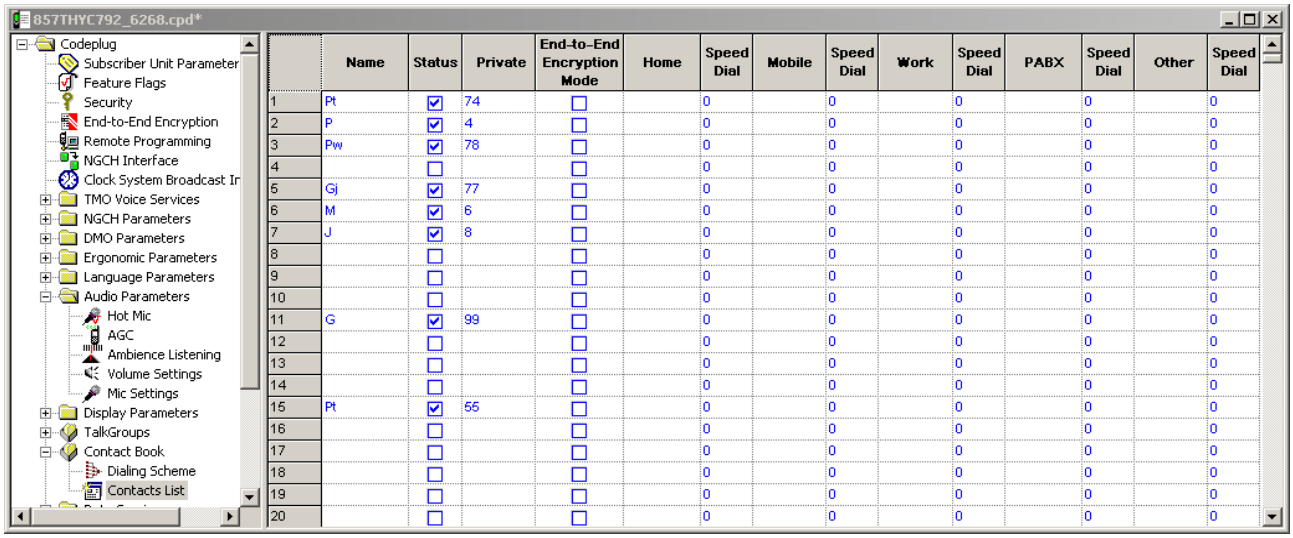
dialing 089 will call 4282089

dialing 389 will call 4282389

dialing 9 will call 4282389 (possible if the value of the Mode field of Entry 1 is Enabled)

Base ISSI 0 in the 7 entries and Mode field Enable mean that the user can enter the real TETRA Identity, i.e. what the user types is sent over the air.

28.2 Contacts List



	Name	Status	Private	End-to-End Encryption Mode	Home	Speed Dial	Mobile	Speed Dial	Work	Speed Dial	PABX	Speed Dial	Other	Speed Dial
1	Pt	☑	74	☐		0		0		0		0		0
2	P	☑	4	☐		0		0		0		0		0
3	Pw	☑	78	☐		0		0		0		0		0
4		☐		☐		0		0		0		0		0
5	Gj	☑	77	☐		0		0		0		0		0
6	M	☑	6	☐		0		0		0		0		0
7	J	☑	8	☐		0		0		0		0		0
8		☐		☐		0		0		0		0		0
9		☐		☐		0		0		0		0		0
10		☐		☐		0		0		0		0		0
11	G	☑	99	☐		0		0		0		0		0
12		☐		☐		0		0		0		0		0
13		☐		☐		0		0		0		0		0
14		☐		☐		0		0		0		0		0
15	Pt	☑	55	☐		0		0		0		0		0
16		☐		☐		0		0		0		0		0
17		☐		☐		0		0		0		0		0
18		☐		☐		0		0		0		0		0
19		☐		☐		0		0		0		0		0
20		☐		☐		0		0		0		0		0

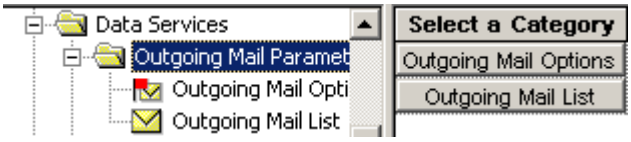
The Contacts List is a storage of information about the people the user wants to communicate with. It allows the user to store frequently used contact information. The list comprises a number of records identified by names. Each record contains the person's contact information, person's name and one or several contact entries of different types. Each contact entry contains the number type (home, work, private, etc.), the number itself, and may include the speed dial number. The user can edit or delete any record or contact entry, or define a new contact entry.

29 Data Services

This menu is used to set up the outgoing mail, short data (service - SDS) and data services.

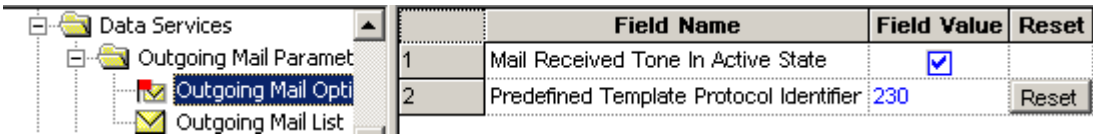
- Outgoing Mail Parameters,
- Status Id List,
- Packet Data Parameters
- Short Data Service
- PEI Parameters

29.1 Outgoing Mail Parameters



Related field is: Paragraph 14.11 "Mail Out"

29.1.1 Outgoing Mail Options



29.1.1.1 Mail Received Tone in Active State

This feature is enabled/disabled by selecting the check box in this field and defines whether or not the Mail Received (MLRCV) Tone In Active State feature is enabled. If enabled, the phone will emit a single beep every time a mail message is received, even when the user is reading, writing, editing or sending a mail message.

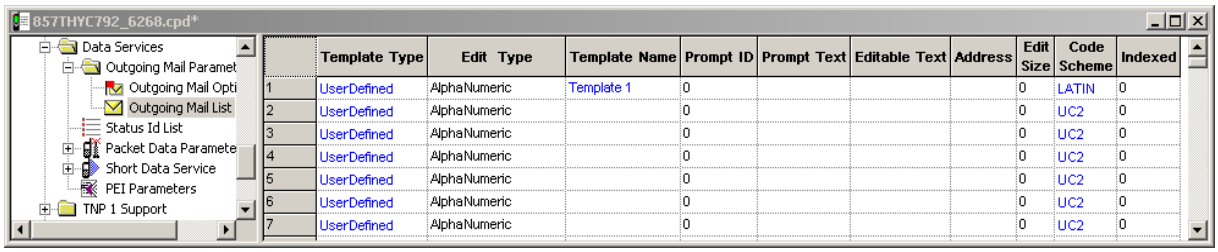
29.1.1.2 Predefined Template Protocol Identifier

Different protocol identifiers are available for the different message types and the entry in this field is transmitted to the phone as part of the Predefined Template message. It enables the terminal to identify the type of message, in this case as a Predefined Template message type 230 (this is also the default). The Valid identifiers are in the ranges:

- 128 - 130
- 135 - 191

- 192 - 255

29.1.2 Outgoing Mail List



	Template Type	Edit Type	Template Name	Prompt ID	Prompt Text	Editable Text	Address	Edit Size	Code Scheme	Indexed
1	UserDefined	AlphaNumeric	Template 1	0				0	LATIN	0
2	UserDefined	AlphaNumeric		0				0	UC2	0
3	UserDefined	AlphaNumeric		0				0	UC2	0
4	UserDefined	AlphaNumeric		0				0	UC2	0
5	UserDefined	AlphaNumeric		0				0	UC2	0
6	UserDefined	AlphaNumeric		0				0	UC2	0
7	UserDefined	AlphaNumeric		0				0	UC2	0

This list may contain up to 100 entries made up of the following options:

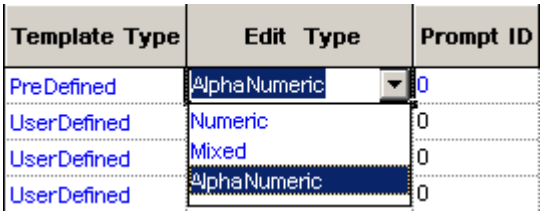
29.1.2.1 Template Type

This field offers the choice between User Defined and PreDefined template types. The PreDefined template is a message sent using the protocol identifier as set in the Codeplug -> MS Short Data Access (SDA)-> MS-SDA Protocol Identifier. This type of messages is intended for database applications connected to the Peripheral Equipment Interface (PEI) of the receiving phone, or for a short data router on the infrastructure, as it is not possible to send pre-defined messages from phone display to phone display.

The User Defined template is a text message enabling the user to save the time by using a pre-typed or saved message. To choose the message type, place the pointer inside the field, click on the arrow, and drag the pointer to the desired selection, the options are:

- User Defined
- Pre Defined

29.1.2.2 Edit Type



This field defines the type of characters that can be edited in the Editable Text field and is only enabled if PreDefined is selected in the Type field.

Three options available are:

- **Numeric** – enables writing of numeric characters only (0 to 9).
- **Mixed** – enables writing of the following characters only: 0 – 9, *, #.
- **Alphanumeric** – enables writing of all available alphanumeric characters.

To choose the characters type, put the pointer inside the field, click on the arrow, and drag the pointer to desired selection.

Note: When selecting the pre-defined text via the menu option, characters can only be deleted.

If User Defined is selected in the Type field, alphanumeric is the default and cannot be changed.

29.1.2.3 Template Name

This field allows user to to edit the template for the User Defined templates or Predefined Templates.

29.1.2.4 Prompt ID

This is a reference number, allowing multiple messages to be sent to the same address. The remote application works out what to do with each message as it is received (i.e. route it to some other destination). The field is enabled only if PreDefined is selected in the Type field.

29.1.2.5 Prompt Text

This field contains non-editable prompt text of up to 12 characters that will appear on the phone screen, e.g. “Arrived At”, the user is then able to add further text to the message. The field is enabled when PreDefined is the selected option in the Type field.

29.1.2.6 Editable Text

This field contains the actual text message (PreDefined or User Defined) and is editable. Edit capability as a PreDefined message is limited to deleting characters. Maximum message size is up to 124 characters for a PreDefined message (according to the Edit Type field selection) and up to 140 alphanumeric characters for User Defined message.

Note: Messages can be created by user action via the menu message option and as well as any received message, they can be stored in this list as a template by selecting the ‘Add to Template’ option while in message mode.

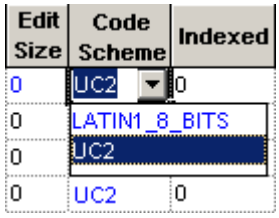
29.1.2.7 Address

This field is only enabled by selecting the ‘PreDefined’ option in the Type field and it contains the address to which the message will be sent, usually to an ISSI.

29.1.2.8 Edit Size

This field defines how much of the text message is editable. If User Defined is selected in the Type field, the Edit Size field content is calculated according to actual message size + 1 up to a maximum of 140 characters. When PreDefined is selected in the Type field, the Edit Size value must be entered manually (up to 124 characters) before writing in the Editable Text field.

29.1.2.9 Code Scheme



There are two available options:

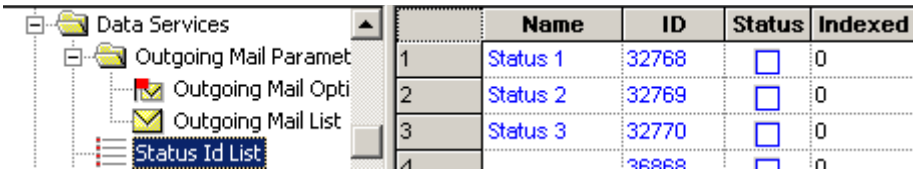
ASCII coding (LATIN1_8_BITS) scheme which is used by most western european languages.

UNICODE standard (UC2) which defines a consistent method of encoding/decoding multilingual text such as Chinese and Korean characters.

29.1.2.10 Indexed

This field indicates whether or not this entry is mapped to a button in the ‘One Touch Buttons’ menu options. If it is, the user is able to quickly recall the text message and send it.

29.2 Status ID List



The Status List is used for sending and receiving short data messages via the control channel. These are short cryptic messages of up to 12 alphanumeric characters.

The list can have a maximum of 100 entries and each entry is associated with the following four column entry fields:

29.2.1 Name

This field contains the alphanumeric message.

29.2.2 ID

The entries in this column contain the ID’s of the messages in the range 32768 - 61439. All numbers prior to 32768 are used by the system for internal addressing. When a short data message is sent, it is the ID and not the message that is transmitted, the received ID is then ‘looked up’ in the list and the corresponding text is displayed.

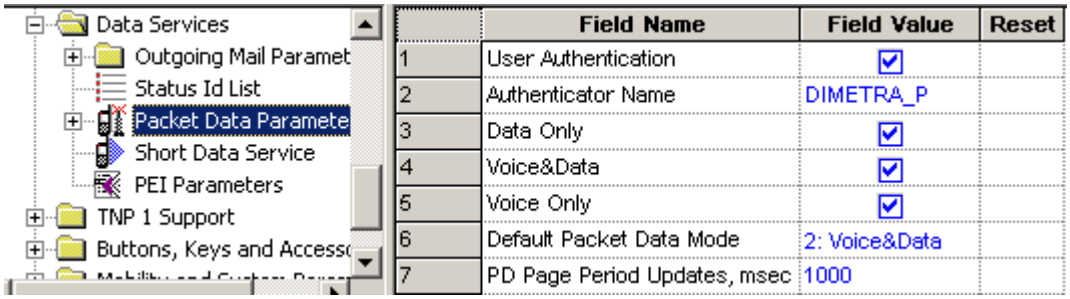
29.2.3 Status

Selecting the check box in this field will validate the message, allowing the user to see it when scrolling the list and send it.

29.2.4 Indexed

This field indicates whether or not this entry is mapped to a button in the ‘One Touch Buttons’ menu options. If it is, the user is able to quickly recall the text message and send it.

29.3 Packet Data Parameters



The following entries define the operation of the terminal’s packet data feature.

29.3.1 User Authentication

This is a method for authenticating the application user prior to allowing activation of the packet data link and indicates whether or not the customer is configured with mandatory User Authentication. Select the check box in this field to enable this option.

See Chapter 2 of the Product Information Manual, Paragraph "PD User Authentication"

29.3.2 Authenticator Name

Authenticator name is a 15 digit alphanumeric name/alias that has been set up on the system, for the Mobile Terminal, that will allow the system to authenticate the user. According to this name, the data Terminal Equipment user application defines which pair "user-name/password" is suitable for this authenticator. The system must support user authentication, otherwise this feature if enabled in the terminal will be ignored by the system.

29.3.3 Data Only

Specifies whether or not the Data Only feature will be enabled as part of the Packet Data features that allows connection to an external device (such as a laptop PC). When set to Data Only Enable and except for emergency calls, the phone will reject incoming and outgoing voice calls, status and text messages. The phone will transmit and receive data via the external device. Select the check box in this field to enable this option.

29.3.4 Voice & Data

Specifies whether or not Voice & Data feature will be enabled as part of the Packet Data features that allows connection to an external device (such as a laptop PC). When set to Voice & Data Enable, the phone will transmit and receive data using the external device. As voice calls have priority over data calls, any received voice call will interrupt an on going data call. Select the check box in this field to enable this option.

29.3.5 Voice Only

Specifies whether or not the Voice Only feature will be enabled as part of the Packet Data features that allows connection to an external device (such as a laptop PC). When set to Voice Only Enable, the phone will only transmit and receive voice calls. Select the check box in this field to enable this option.

29.3.6 Default Packet Data Mode

This field defines the default Packet Data mode after power up and can be

- **Data Only**,
- **Voice & Data**, or
- **Voice Only**.

These options are only available if enabled in 3, 4 & 5 above.

Place the mouse arrow in the entry field and press the left mouse button to display the ‘Down Arrow’. Select the down arrow to display the available options, using the left mouse button select the required option.

Related field is:

Paragraph 14.17 "Packet Data"

29.3.7 PD Page Period Updates

Indicates the period of time for radio to update the information on Packet Data (PD) page.

The range is from 500 to 10,000 msecs, the default value is 1,000 msecs.

29.3.7.1 Internal User Authentication

- **Protocol Type**

Specifies the packet data user authentication type that this application should use during context activation. There are 2 protocol types supported:

- **PAP**
- **CHAP**

To select the option, put the pointer into the field value, click on the arrow, and drag the pointer to the desired option.

Please contact the service provider to obtain the protocol type. It is only relevant for internal multi slot packet data applications like the WAP application. For external applications, like dial-up, the packet data user authentication is supported automatically by the terminal.

- **User Name**

This user name is used to authenticate he radio user during PPP connection setup.

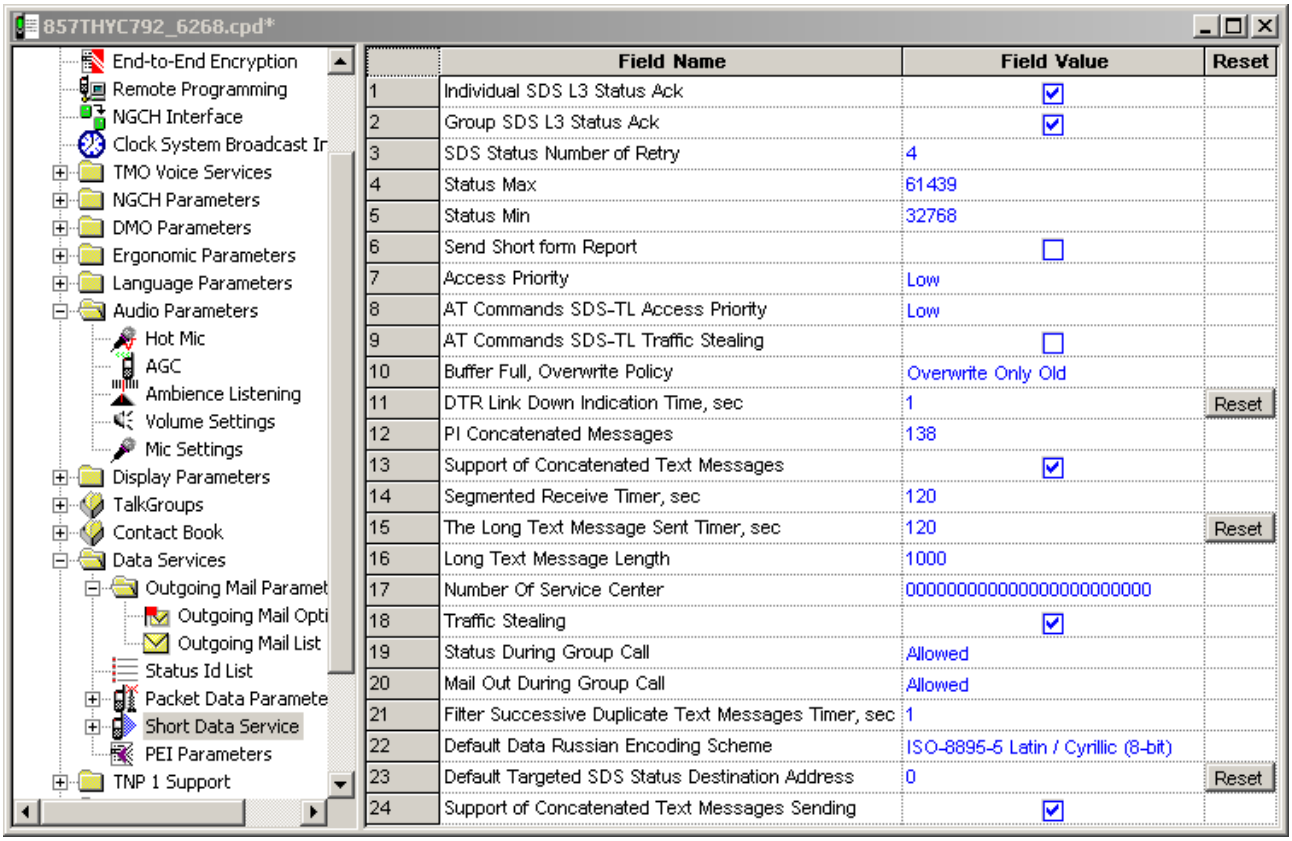
Enter the user name in the text box with a choice of any characters.

- **Password**

This password is used to authenticate he radio user during PPP connection setup.

Enter password in the text box with a choice of any characters.

29.4 Short Data Service (SDS)



	Field Name	Field Value	Reset
1	Individual SDS L3 Status Ack	☑	
2	Group SDS L3 Status Ack	☑	
3	SDS Status Number of Retry	4	
4	Status Max	61439	
5	Status Min	32768	
6	Send Short form Report	☐	
7	Access Priority	Low	
8	AT Commands SDS-TL Access Priority	Low	
9	AT Commands SDS-TL Traffic Stealing	☐	
10	Buffer Full, Overwrite Policy	Overwrite Only Old	
11	DTR Link Down Indication Time, sec	1	Reset
12	PI Concatenated Messages	138	
13	Support of Concatenated Text Messages	☑	
14	Segmented Receive Timer, sec	120	
15	The Long Text Message Sent Timer, sec	120	Reset
16	Long Text Message Length	1000	
17	Number Of Service Center	000000000000000000000000	
18	Traffic Stealing	☑	
19	Status During Group Call	Allowed	
20	Mail Out During Group Call	Allowed	
21	Filter Successive Duplicate Text Messages Timer, sec	1	
22	Default Data Russian Encoding Scheme	ISO-8895-5 Latin / Cyrillic (8-bit)	
23	Default Targeted SDS Status Destination Address	0	Reset
24	Support of Concatenated Text Messages Sending	☑	

The following menu options are used to set the terminal's configuration for sending Status Messages.

29.4.1 Individual SDS L3 Status ACK

If this option is enabled, by selecting the check box, the terminal will receive an acknowledgement when a status message is sent to an individual ISSI.

The sending terminal does not receive the acknowledgement from the receiving terminal, but from the system. If the receiving terminal is contactable by the system, the system will 'Ack' the message.

29.4.2 Group SDS L3 Status ACK

If this option is enabled, by selecting the check box, the terminal will receive an acknowledgement when a status message is sent to a Group.

The sending terminal does not receive the acknowledgement from the receiving group terminals, but from the system. If any of the receiving group members are contactable by the system, the system will 'Ack' the message.

29.4.3 SDS Status Number of Retry

The Field Value entry for this option defines how many times the terminal will attempt to send a status message.

The range is from 0 to 10.

29.4.4 Status Max

The TETRA standard defines the number range of status messages as 32768 to 61439.

The number entered in this field will be the highest number that the terminal user can see and send.

The default is 61439.

29.4.5 Status Min

The TETRA standard defines the number range of status messages as 32768 to 61439.

The number entered in this field will be the lowest number that the terminal user can see and send.

The default is 32768.

29.4.6 Send Short Form Report

This Feature is a requirement for Nokia Systems.

When this feature is enabled, the terminal will automatically request an acknowledgement or send an acknowledgement, whenever it sends or receives a status message.

29.4.7 Access Priority

This field is used to set the access priority of the SDS-TL reject report when no application is registered to service.

Select the Field Value window to display the down arrow and the following available options:

- **Low**
- **High**

The default value is Low.

29.4.8 AT Commands SDS-TL Access Priority

This field is used to set the access priority for call set up using this data connection method.

When a computer is connected to a terminal and is being used as a ‘Hyper Terminal’, the user is able to use the ‘AT’ command set for data communication.

Select the Field Value window to display the down arrow and the following available options:

- **Low**
- **High**

The default value is Low.

See Chapter 4 of the Product Information Manual.

29.4.9 AT Commands SDS-TL Traffic Stealing

It is possible, using AT Commands, to temporarily steal part of a traffic channels signalling capacity to pass the message when this option is set to ‘High’.

29.4.10 Buffer Full, Overwrite Policy

As the terminal receives status messages, its buffer will eventually fill if messages are not deleted.

This feature has the following options:

- **None** - If this option is selected, the terminal will not buffer any more received status messages once it is full.

Note: Incoming messages - display will notify the user with the text “Inbox Full Msg Lost”

Note: Outgoing messages - display will notify the user with the text “Outbox Full Can Not Send”

- **Overwrite Old + New** - Selecting this option allows the terminal to overwrite any buffered status message when the buffer is full.
- **Overwrite only Old -** Selecting this option allows the terminal to overwrite only the oldest buffered status message, when the buffer is full.

29.4.11 DTR Link Down Indication Time, sec

When the terminal is in data mode, this is the time after which it will indicate, to the user, that the down link has been lost.

The range of this timer is 0 to 255 seconds.

29.4.12 PI Concatenated Messages

The Protocol Identifier (PI) is the information element the MS uses when receiving text messages.

The MS will only accept concatenated text messages with the Protocol Identifier set to the indicated value.

The concatenated text messages function enables the MS to receive text messages longer than 140 bytes using a special protocol called UDH (User Data Header).

Type the required value in the field.

29.4.13 Support of Concatenated Text Messages

Defines whether there is a support of concatenated messaging (receiving long SDS messages greater than 140 bytes).

A concatenated text message is a chunk of a segmented Long Text Message.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

29.4.14 Segmented Receive Timer, sec

At the indicated time, the segmented receiver timer shall expire when not all concatenated text messages belonging to the same long text message (same Message Reference Number) have been received.

The operating value depends on the load profile of the customer.

Type the required value in the field.

29.4.15 The Long Text Message Sent Timer, sec

At the indicated time, the Long Text Message Sent Timer will expire, when not all delivery status belonging to the same Long Text Message (same Message Reference Number) have been received.

Type the required value in the field.

29.4.16 Long Text Message Length

Defines the maximum length of long text messages in characters.

LTM are short data messages with at least 500 characters 8-bit coded or 250 characters 16-bit Unicode coded. This length refers to message text only without Protocol Identifier (PI) information.

Type the required value in the field.

29.4.17 Number Of Service Center

Enter the number (address) of the Message Service Centre that will be responsible for storing and forwarding the subscriber's outgoing messages.

29.4.18 Traffic Stealing

When this field is enabled and a terminal is transmitting party in a circuit mode call, the SDS message will be sent on the traffic channel by stealing frames from the audio if the message is short enough to be sent this way.

Turn the check box on or off by clicking on it.

29.4.19 Status During Group Call

Defines option for sending a status during active group or broadcast call.

The options are:

- · Not Allowed - Not allowed to send Status while there is an active group call.
- · Leave Call to send Status - The call will be disconnected and the Status will be sent.
- · Allowed - Status will be sent without disconnect the call.

To select the option, put the pointer into the field value, click on the arrow.

29.4.20 Mail Out During Group Call

Defines option for sending a text message during active group or broadcast call.

The options are:

- **Not Allowed** - Not allowed to send text message while there is an active group call.
- **Leave Call to send Mail** - The call will be disconnected and the text message will be sent.
- **Allowed** - Text message will be sent without disconnect the call.

The default is set to ’Allowed’.

To select the option, put the pointer into the field value, click on the arrow.

29.4.21 Filter Successive Duplicate Text Messages Timer, sec

Service Provider can send SDS message more then once. Duplicated messages (that are full y equal), received one after the other during a pre-defined period of time, will be filtered.

Type in the required value in seconds.

29.4.22 Default Data Russian Encoding Scheme

Indicates which Russian SDS encoding scheme will be used.

There are 2 encoding schemes available to encode the SDS message:

- **ISO-8895-5 Latin / Cyrillic (8-bit)**
- **Unicode (16-bit)**

To select the option, put the pointer into the field value, click on the arrow, and drag the pointer to the desired option.

When the flag is set to ISO/IEC 8859-5 (0x05), the radio will transmit a SDS message at most 140 characters long. When the flag is set to Unicode (0x1A), the radio will transmit a SDS message at most 70 characters long.

29.4.23 Default Targeted SDS Status Destination Address

Indicates the default Targeted Short Data Services (SDS) Status Destination Address.

To change the address, type in the value between 0-15999999, 16777215.

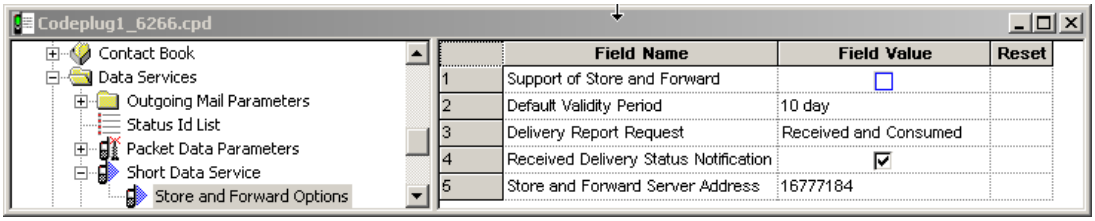
29.4.24 Support of Concatenated Text Messages Sending

Defines whether there is a support of concatenated messaging (sending long SDS messages greater than 140 bytes).

A concatenated text message is a chunk of a segmented Long Text Message.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

29.5 Store and Forward Options



29.5.1 Support of Store and Forward

If the check box is enabled this feature will be available to the users.

29.5.2 Default Validity Period

It indicates how long the outgoing message should be held.

To choose the period click on the arrow, and drag the pointer to the desired period (range: 0-10 days)

Note: Selecting "No validity" means that the Message Service Centre will not hold the undelivered message.

29.5.3 Delivery Report Request

Specifies the circumstances/condition in which the radio will send a Delivery Report Reply.

The options are:

- · None - no message delivery report is sent to the sender when a message is received by the recipient.
- · Received - message delivery report is sent automatically to the sender when a message is received by the recipient.
- · Consumed - message delivery report is sent automatically to the sender when a message is read by the recipient.
- · Received and Consumed – message delivery report is sent automatically to the sender when a message is received and read by the recipient.

Note: The radio shall not send a report when the received destination address is Group or Broadcast:

To select the option, put the pointer into the field value, click on the arrow, and drag the pointer to the desired option.

29.5.4 Received Delivery Status Notification

This option indicates if the Store and Forward Delivery Status Notification is enabled or disabled. If this is unchecked, user will not be notified when the Delivery Status is received.

29.5.5 Store and Forward Server Address

It defines the Server Address in the SDS-layer. It is expressed in the hexadecimal (range: 000001 - FFFFFFE).

29.6 PEI Parameter

Lists the parameters related to the Peripheral Equipment Interface (PEI) feature.

29.6.1 Baud Rate

Selects the transmission rate at which data flows between DTE (e.g. computer) and DCE (i.e. this TETRA terminal). Baud rate is the number of bits of information, including "control" bits that are transmitted per second.

The possible values are 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200 bps. The value chosen here will be the default value at radio power-up. The default value is 9600 bps.

To select the option, put the pointer into the field value, click on the arrow, and drag the pointer to the desired option.

29.6.2 Parity Bit

Determines whether an optional Parity Bit is used on serial communication between DTE (e.g. computer) and DCE (i.e. this TETRA terminal).

The parity bit indicates whether the number of 1 bits in the preceding data was even or odd. If a single bit is changed in transmission, the message will change parity and error can be detected at this point. This bit is meant for simple error checking.

There are 4 parity schemes available:

- **PARITY_ODD** - asserts or un-asserts a parity bit to set the total number of 1 bits to be odd in the data.
- **PARITY_EVEN** - asserts or un-asserts a parity bit to set the total number of 1 bits to be even in the data.
- **PARITY_MARK** - asserts a parity bit in the data. The parity scheme is programmed to odd.
- **PARITY_SPACE** - un-asserts the parity bit in the data.

The option chosen here will be the default value at radio power-up.

To select the option, put the pointer into the field value, click on the arrow, and drag the pointer to the desired option.

29.6.3 ETSI AT SDS/Status Format

- Enabled - radio supports the ETSI commands (+CTSP, +CTSDS, +CMGS, +CTSDSR) and syntax for sending/receiving SDS/Status via AT commands

Disabled - radio supports the Motorola commands (+CMGS, +CMT) and syntax for sending/ receiving SDS/Status via AT commands

30 TNP1 Support

The TETRA Network Protocol type 1 (TNP1) allows the user of a Terminal Equipment (such as a PC) to control TETRA services at the Mobile Terminal via the TETRA Peripheral Equipment Interface (PEI).

The TETRA services include: Mobility Management, Call Control, Short Data Service (SDS), and Supplementary Services. In addition, there are commands to access the MT2 configuration and storage parameters.

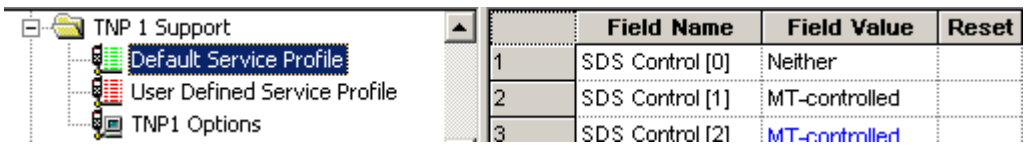
To handle the TNP1 interface, the TNP1 application must run on TE2.

The TE2 has to be connected via the RS232 serial communication cable and its application has to be registered on the MT2.

SDS is available to the TNP1 application running on TE2. The TE2 application can access SDS via AT commands, or TNP1 on UDP/PPP protocol. This means either AT commands or UDP/PPP, not both at the same time.

The following menu options are used to configure the terminal's configuration for TETRA Network Protocol type 1 (TNP1) Support:

30.1 Default Service Profile



This is a list of 256 read-only cells to store in each cell the Default Service Profile for each Protocol Identifier (PI). The values of the cells are used only while the Point-to -Point (PPP) link is up (i.e.: AT ON-line). The position of each cell within the list determines its PI. For example, PI for the first cell is 0 and for the last cell is 255.

Each cell has the structure of information element "SDS (Short Data Service) Control".

The field values may be as follows:

- **MT-controlled** - only the application in MT will transmit requests or receive responses when it controls the services.
- **TE-controlled** - only the application in TE will transmit requests or receive responses when it controls the services.
- **Neither**

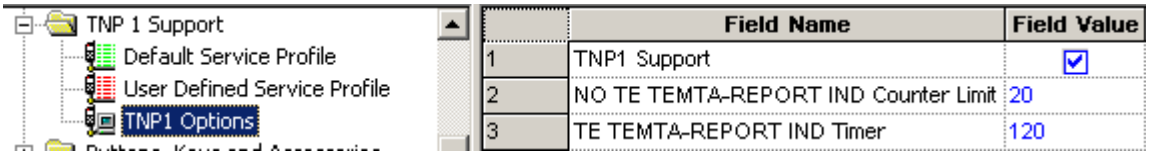
Values of some PIs cannot be changed, as they are reserved for the future use or restricted by internal MT application.

30.2 Default Service Profile

This is a list of 256 read-only cells to store in each cell the User-Defined Service Profile for each PI. The values of the cells are used only while the PPP link is up. The position of each cell within the list determines its PI.

Each cell has the structure of information element “SDS (Short Data Service) Control”.

30.3 TNP1 Options



This menu is used to set the button/key functionality and it has the following options:

30.3.1 TNP1 Support

The TNP1 feature operates only when Packet Data or External Device is enabled in the codeplug (i.e.: a PPP session with MT2 can be estabilished).

Turn the check box (Enable) or off (Disable) by clicking in the check box.

30.3.2 NO TE TEMTA-REPORT IND Counter Limit

This is a Service Profile timer. MT2 terminates its PPP link with TE2 and resets to zero he NO TEMTA-REPORT IND counter when the counter reaches its maximum value.

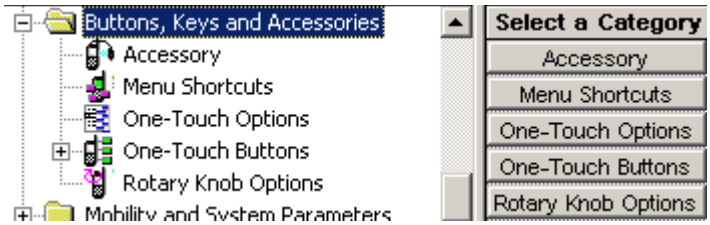
The range of this timer is 1 to 100.

30.3.3 TE TEMTA-REPORT IND Timer

This is a Service Profile timer. MT2 uses TE TEMTA-REPORT IND timer in combination with NO TEMTA-REPORT IND counter over limit to decide when to terminate the PPP link

The range of this timer is 1 to 300.

31 Buttons, Keys and Accessories



This menu defines:

- The type of accessory that can be used with the terminal.
- The one touch functionality of any button/key programmed with this feature.

The available options are:

31.1 Accessory

Field Name	Field Value
Accessory Selection	MTM700 External Mic
Ring Source	In Radio
Tones Path Selection for PHF Accessory in Idle Mode	PHF Earpiece
Telephone Handset Enable External Speaker on Hook for G	Disabled

This menu has the following features:

31.1.1 Accessory Selection

Enables the selection of the accessory type that will be connected to the phone.

Depending on the terminals' models, the available accessory types are:

- **Speaker Mic**
- **Headset/Covert**
- **Earpiece**
- **Handset**
- **Standard Mic**
- **Handset**
- **External Mic**

To select the accessory, put the pointer into the field value, click on the arrow, and drag the pointer to the desired accessory type.

31.1.2 Ring Source

The available options with this feature defines where the ring tones will be heard, either from the accessory or from the terminal's internal loudspeaker:

- **In Radio**
- **In Accessory**

31.1.3 Tones Path Selection for PHF Accessory in Idle Mode

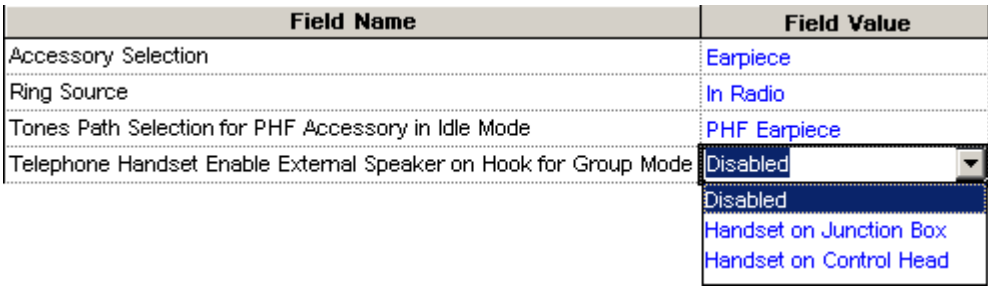
This feature is used to select the active speaker for tone alerts.

The options are

- **INT Speaker**
- **PHF Earpiece** (external speaker).

To select an option, put the pointer into the field value, click on the arrow, and drag the pointer to the desired option.

31.1.4 Telephone Handset Enable External Speaker on Hook for Group Mode



If the feature is enabled, the terminal switches the audio to an external speaker in Group mode when the telephone handset (GMUN1006) is placed on hook and it disables the operation of the high/low audio softkey whilst the telephone handset is on hook.

This feature only works when a telephone handset is installed/selected.

Select if the feature is disabled, or when enabled, if the Handset is connected via a junction box or directly plugged into the control head.

31.2 Menu Shortcuts

Shortcuts are a way for the user to "mark" locations in the menu that are frequently used in order to access them quickly. For example, if the user changes the ringer style often, marking the "Tones" setting menu as a shortcut would allow the user to quickly navigate to that menu.

The Menu shortcuts feature processes user key presses to recognize and display/perform the action of the corresponding item. This feature provides the following options to the user:

- Setting shortcuts
- Executing shortcuts
- Viewing the shortcut list
- Shortcut menu
- Getting help on setting shortcuts
- Editing shortcuts
- Deleting shortcuts
- Deleting all shortcuts

31.3 One-Touch Options

This menu is used to set the button/key functionality and it has the following options:

31.3.1 One Touch Keypad Keypress Timer

The entry in this field sets the time duration that a **Keypad Button** must remain pressed before the one-touch functionality is activated.

It has a range of 1000 to 5000 msecs, the default being 1000 msecs.

31.4 One Touch Buttons

Allows assignment of often-used functions to a single button press on a numeric keypad button (long key press).

Note: Programming these buttons adds One-touch features on models without dedicated function buttons (For example: MTH800 and Motorcycle MTM700).

The CPS will display only the codeplug blocks and programming options that are applicable to the active phone model.

There are up to 10 programmable One-touch function buttons (0-9 digits).

Key 0: "0" and "+" are available on this key. If you configure this key to serve as a One-touch button, the "+" will not work. If you do not configure this key to serve as a One touch button, the "+" will work fine.

Programming the One-touch Buttons

Upon pressing on each programmable key in the CPS, a programmable window will be opened for that key. In the first stage, only one file called "One-touch Function" will appear. The user will be able to choose one function from a function list. According to the chosen function, the programmable window will expand and include appropriate parameters for that function. (In case the chosen function comes with no parameters, the programmable window will not expand.) The user must fill up all the necessary parameters for that function, otherwise he will not be able to exit from that window and an error message will appear.

Apart from ‘unassigned’, there are another the following available options:

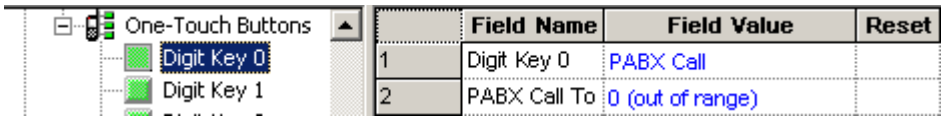
- · PABX call
- · Phone call

- Private call
- Change Talkgroup
- Sending Private Status
- Sending Group Status
- TXI (Transmit Inhibit)
- Hi/Lo Audio
- Flip Display
- TMO <-> DMO Switch
- Home Revert
- TMO Talkgroup Scan
- Backlight
- Unassigned
- Screen Saver Activation
- Covert Mode(only available in certain radio software versions)
- Horn& Lights
- Change Talkgroup to the Last/Previously Selected Talkgroup

31.4.1 Covert Mode

If enable, this will enable the terminal user to enter the covert mode, via a one touch button press, to grayscale and dim the display. All the calls are routed to the earpiece (if connected).

31.4.2 PABX Call



Once this option has been selected, the ‘PABX Call To’ Field Name is displayed.

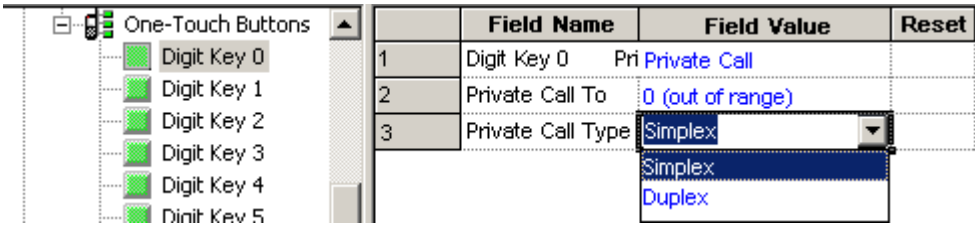
Place the pointer into the ‘Field Value’, click on the down arrow to display the Contact Book \ PABX List. Place the pointer on the required option and select the option by clicking the left mouse button. The selected phone number will now be entered into this field.

31.4.3 Phone Call

Once this option has been selected, the ‘Phone Call To’ Field Name is displayed.

Place the pointer into the ‘Field Value’, click on the down arrow to display the Contact Book \ Phone List. Place the pointer on the required option and select the option by clicking the left mouse button. The selected phone number will now be entered into this field.

31.4.4 Private Call



Once this option has been selected, the ‘Private Call To’ and ‘Private Call Type’ Field Names are displayed, both of which are editable.

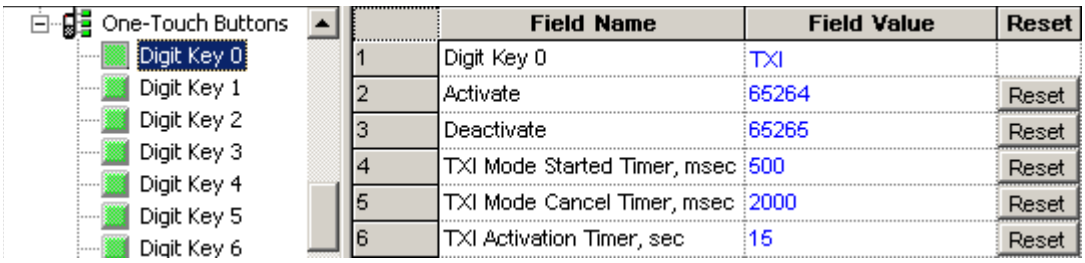
31.4.4.1 Private Call To

Place the pointer into the ‘Field Value’, click on the down arrow to display the Contact Book \ Private Call List, place the pointer on the required option and select it by clicking the left mouse button. The selected ISSI with its associated name and list position will now be entered into this field.

31.4.4.2 Private Call Type

Place the pointer into the ‘Field Value’, click on the down arrow to display the Simplex \ Duplex option, place the pointer on the required option and select it by clicking the left mouse button. The selected option will now be entered into this field.

31.4.5 TXI (Transmit Inhibit)



When this option is chosen, the following fields are enabled:

31.4.5.1 Activate

When TXI is enabled, the terminal can send a status message informing the dispatcher that it is in TXI mode and is receive only. The status message number is manually entered into this field and is not selectable from the Status List entries.

31.4.5.2 Deactivate

When TXI is disabled, the terminal can send a status message informing the dispatcher that it is in now in normal operating mode. The status message number is manually entered into this field and is not selectable from the Status List entries.

31.4.5.3 TXI Mode Started Timer

The entry in this field sets the time that the button must remain pressed before the TXI mode is started.

The range is from 1 to 5000 msecs and the default is 500 msecs.

31.4.5.4 TXI Mode Cancel Timer

The entry in this field sets the time that the button must remain pressed before the TXI mode is cancelled and the terminal reverts to normal operation.

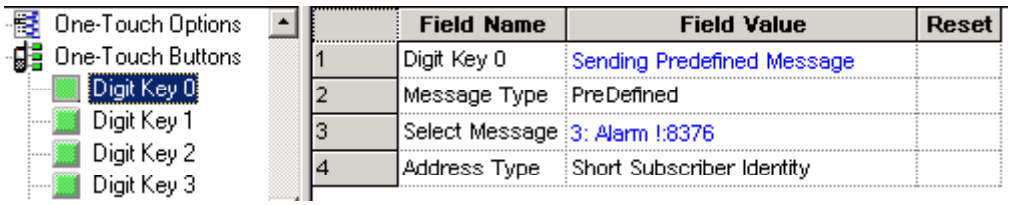
The range is from 1000 to 5000 msecs and the default is 2000 msecs.

31.4.5.5 TXI Activation Timer

This is the time delay between TXI being selected and TXI actually starting, it allows time for all on going procedures to be completed before transmission is actually blocked.

The range is from 1 to 30 seconds and the default is 15 seconds.

31.4.6 Sending Predefined Message



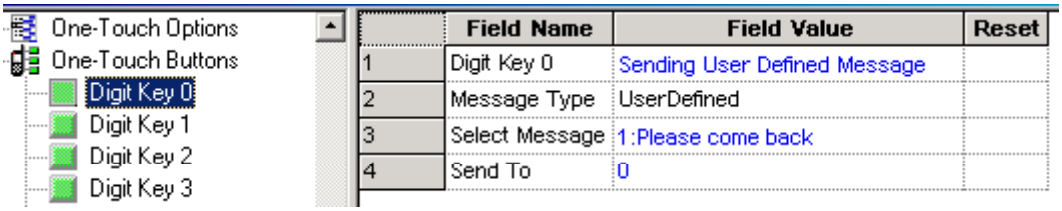
This function sends a predefined message to the address that is already stored in the codeplug.

Related field:

Paragraph 29.1.2 "Outgoing Mail List"

Note: Sending Predefined Message is only available if the appropriate values are set in the Outgoing Mail List.

31.4.7 Sending User Defined Message



This function sends a user defined message to the address that is already stored in the codeplug.

The user will be asked for a target selection if Send To is set to 0.

Related field:

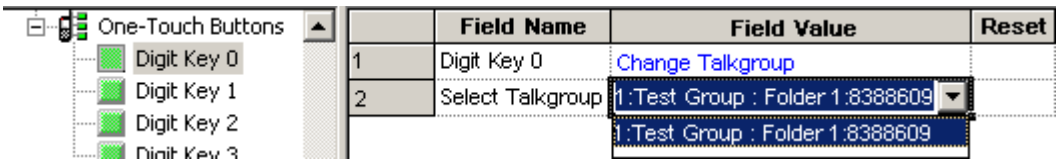
Paragraph 29.1.2 "Outgoing Mail List"

Note: Sending User Defined Message is only available if the appropriate values are set in the Outgoing Mail List.

31.4.8 Hi/Lo Audio

This function changes the speaker between Speaker: On/Speaker: Off.

31.4.9 Change Talkgroup



This option enables fast selection of a predefined talkgroup and different talkgroups may be assigned to different buttons.

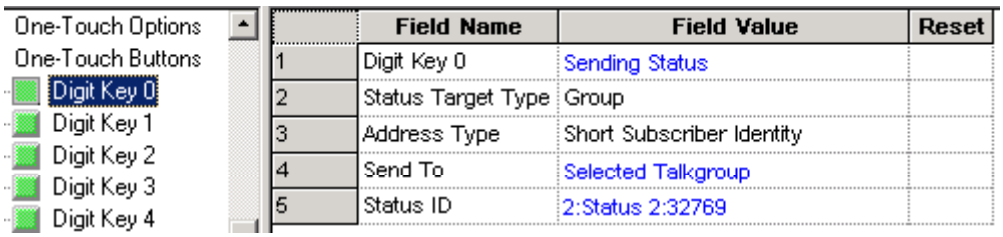
31.4.10 Change Talkgroup to Latest Previously Selected

This option enables fast selection of the talkgroup that was selected previously.

That is when TG-1 is current user talkgroup and the previous one is TG-2. In this case to go back to TG-2 user needs to press the one-touch button that is set in CPS to select previous talkground.

Only one last talkgroup is stored.

31.4.11 Sending Status



This option allows the user to send a specific status message to a specific talkgroup.

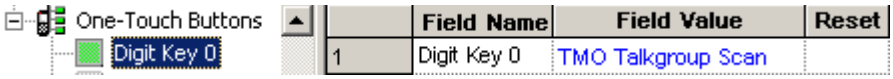
Related field:

Paragraph 14.2 "Status"

31.4.12 TMO <-> DMO Switch

When this option is assigned to a button, the user is able to change the terminal's operational mode between TMO and DMO via a single button press.

31.4.13 TMO Talkgroup Scan

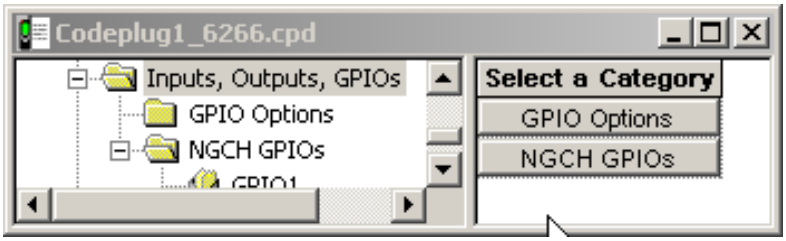


This one touch option is used to enable/disable talkgoup scan.

31.4.14 Home Revert

If a button is programmed with this option, then the user to is able to select Home mode.

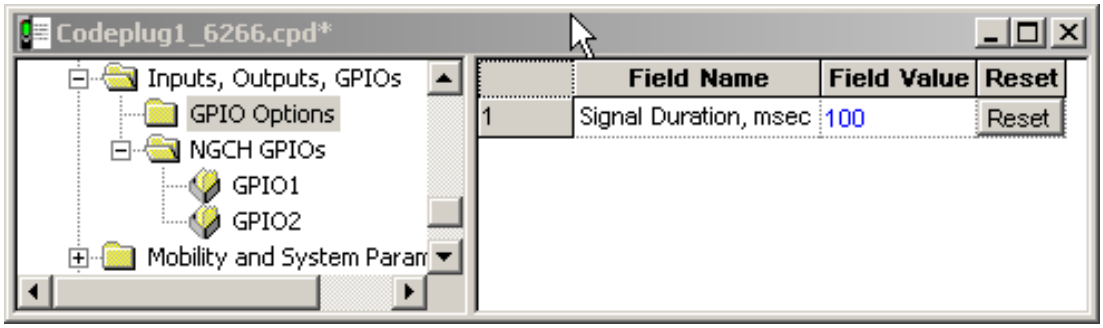
32 Inputs, Outputs, GPIOs



These menus are used for Control head's input, output, and general programmable input output GPIO settings.

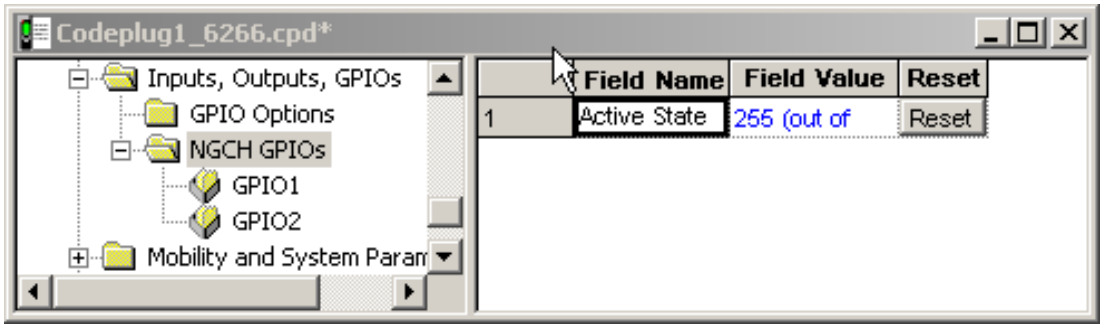
This contains the following menus, of which the Frequency List menu has several sub menus.

32.1 GPIO Options



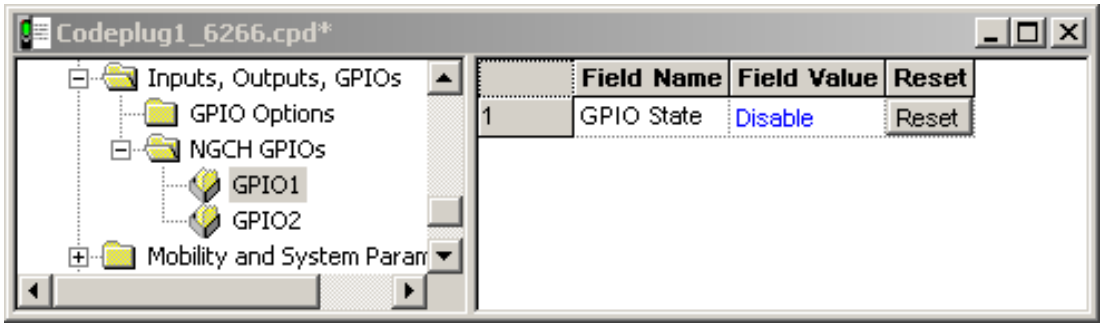
Signal Duration, msec - defines duration of the output of the signal given on the certain output port.

32.2 NGCH GPIOs



Defines which level (low or high) is to be regarded as a signal on certain GPIO.

32.2.1 GPIO1



GPIO State

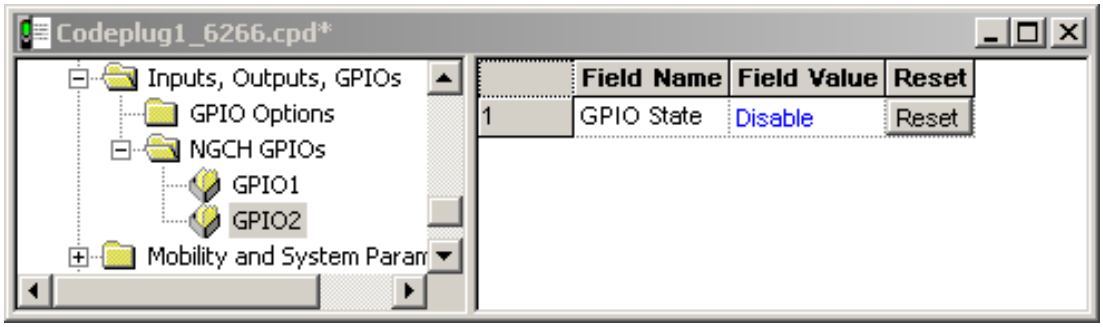
Selects the GPIO1 state.

The options are:

- · Disable - GPIO1 is deactivated.
- · Input - the user can setup GPIO1 to work as input pin, in this case, Send predefined message.

- ·Output – the user can setup GPIO1 to work as output pin, in this case, Send specific message indication.

32.2.2 GPIO2



GPIO State

Selects the GPIO2 state.

The options are:

- ·Disable - GPIO2 is deactivated.
- ·Input - the user can setup GPIO2 to work as input pin, in this case, Send predefined message.

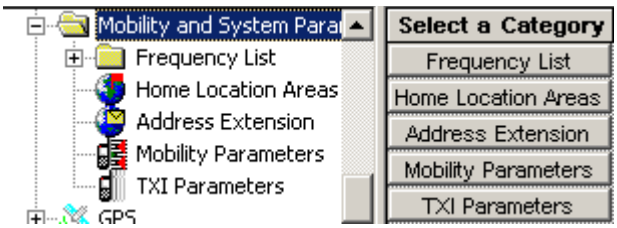
·Output – the user can setup GPIO2 to work as output pin, in this case, Send specific message indication.

32.2.3 Sending Predefined Messages using PIN 14 and 3

Two requirements are need to be checked:

- Input of PIN 14 and 3 needs to be set as: GPIO State = Input, and GPIO Function = Send Predefined Message (this function is invisible until you set GPIO State)
- PIN 14 or 3 needs to be connected to PIN 13 which is grounded

33 Mobility and System Parameters



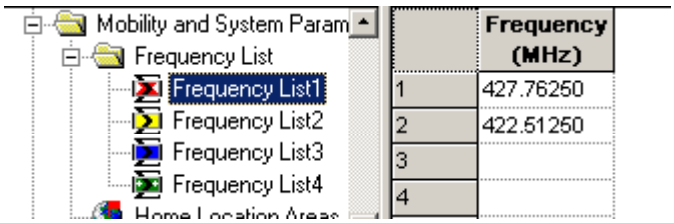
These menus are used for programming the terminal with the necessary system parameters that will enable the terminal to work on the system.

This contains the following menus, of which the Frequency List menu has several sub menus.

33.1 Frequency List

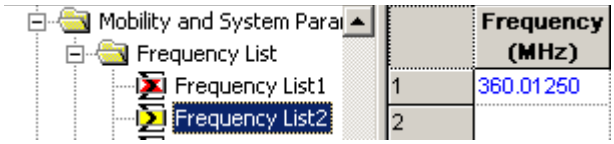
This contains the following four frequency lists:

33.1.1 Frequency List 1



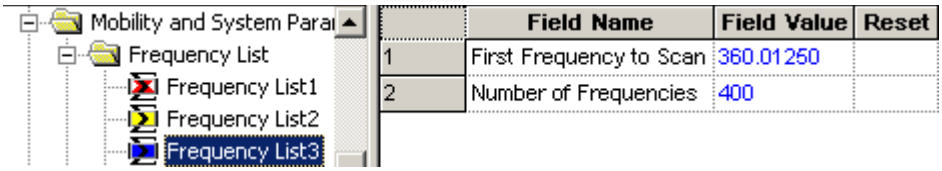
Displays a dynamic list of discrete frequencies that the terminal scans to find a valid TETRA system. This list is maintained internally by the unit's embedded software only.

33.1.2 Frequency List 2



This list contains up to 32 valid cell frequencies for the system(s) to which the terminal has access. Frequencies must be entered here to enable first time rapid access to a system. If no frequencies were entered, the terminal would use the comprehensive hunt feature of lists 3 & 4 if enabled.

33.1.3 Frequency List 3



Lists 3 & 4 allow flexibility in the comprehensive hunt, both have the same options but the field values should be different to allow for the different system frequencies.

33.1.3.1 First Frequency to Scan

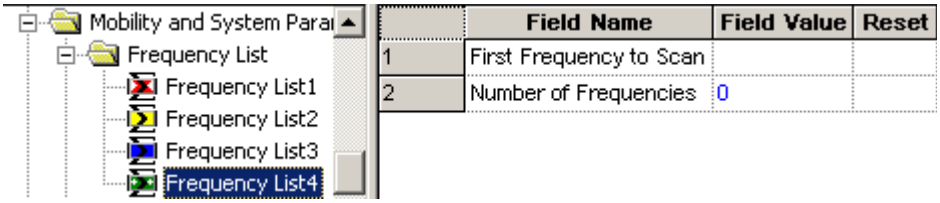
This might appear to be a straight forward entry of the base frequency of the system(s), but the terminal checks frequencies in 25kHz steps and systems may be using 25kHz, 12.5kHz or 6.25kHz offsets. In the above picture the base frequency has a 12.5kHz offset.

33.1.3.2 Number of Frequencies

The entry in this field defines how many frequencies, upwards from the base frequency, the terminal will check.

As shown above, the terminal will check 399 frequencies and as there is a step size of 25kHz, all frequencies from 420.01250MHz to 429.975MHz inclusive will be checked.

33.1.4 Frequency List 4



It may not be necessary to use this list, in which case ensure there are no entries in the field values.

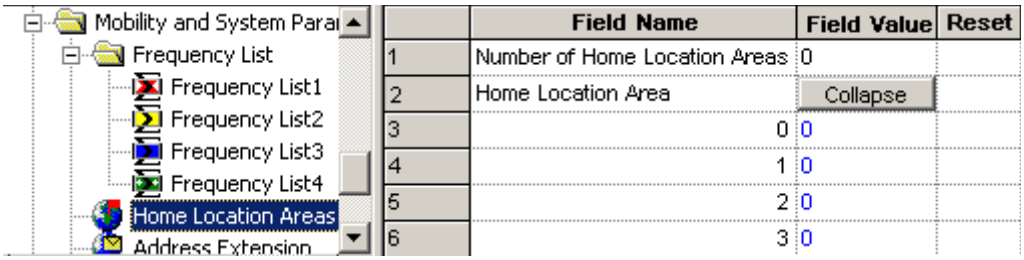
Using both tables adds flexibility to the comprehensive hunt if it is required for multiple system access that use different frequencies offsets. In the above picture the base frequency has a 6.25kHz offset and the frequencies scanned will be from 420.00625MHz to 429.98125MHz inclusive.

Note: It is more likely that lists 3 & 4 will have 25kHz and 12.5kHz offsets.

Comprehensive Hunt - is used when the terminal cannot log on to a system using the frequencies in lists 1 & 2. The terminal will search a predefined number (block) of frequencies in List 3, then check the frequencies in lists 1 & 2 before returning to List 3 and searching the next block of frequencies. This procedure is repeated until the frequencies of both lists 3 & 4 have been checked.

The terminal will repeat this procedure until a system is found on which it can register.

33.2 Home Location Areas



These two has two options that define the system cells to which the terminal may roam and operate.

33.2.1 Number of Home Location Areas

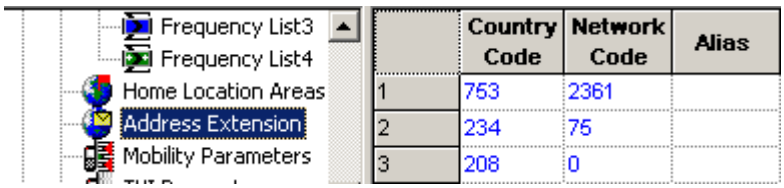
The number in this field is automatically entered by the CPS after the Home Location Areas have been defined.

33.2.2 Home Location Area

This is a collapsible table that can have up to 34 entries and contains the cell numbers of the cells which are the preferred cells on which the terminal should work.

Select the ‘Expand’ option to open the table and enter the cells to which the terminal can register. Afterwards ‘Collapse’ the table and the number of cells to which the terminal can roam will be displayed on line 1.

33.3 Address Extension



	Country Code	Network Code	Alias
1	753	2361	
2	234	75	
3	208	0	

This is a list can have up to 100 entries of systems to which the terminal has access. As the terminal does not have multiple personalities, its ISSI and groups must also be in the data bases of each system for it to work on those systems.

Note: The first entry is the default or 'Home' system and is the first system that the terminal will attempt registry.

The list has the following fields:

33.3.1 Country Code (MCC)

This is the country code of the system

33.3.2 Network Code (MNC)

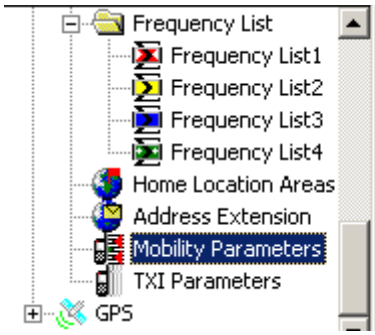
This is the systems unique ID

Note: The MCC and MNC are provided by the in country licensing authority.

33.3.3 Alias

This is the name or alias of the system and can be a maximum of 11 characters.

33.4 Mobility Parameters



	Field Name	Field Value	Reset
1	Min RSSI Threshold Delta	-110	Reset
2	Start Monitoring Threshold Delta	10	Reset
3	Stop Monitoring Delta	10	Reset
4	Subscriber Class	0xFFFF	Reset
5	SC Acquisition Timer, sec	30	Reset
6	MLE Sleep Timer, sec	5	Reset
7	Type 2 Reselection Enabled	☑	
8	RSSI Scan Frequency Block Size	16	

The entries in this field help the terminal to determine a valid control channel when searching for a 'new cell' on which to attach and also enable the system SwMI to allocate resources to the terminal.

33.4.1 Min RSSI Threshold Data

The entry in this Field Value defines the received minimum average signal strength that will be considered by the terminal as a viable control channel.

The range is 0 to -127, the default being -110.

33.4.2 Start Monitoring Threshold Delta

This Field Value is used to set the tolerance threshold above the Slow Reselect Threshold.

The Slow reselect Threshold parameter is one of several system parameters settings used to set for setting a cells coverage area and the defined RSSI of these parameters is used by the terminal to determine cell reselection.

If the RSSI of a cell is above this Field Value setting, the signal strength of the cell's control channel is considered strong enough so that the terminal will not normally scan other neighbour cells,

33.4.3 Stop Monitoring Delta

The entry in this Field Value defines the value of the received signal above that set in the Start Monitoring Threshold Delta Field Value after which the terminal will stop monitoring the received control channel RSSI.

33.4.4 Subscriber Class

Systems may be able to divide their subscriber population into different 'Classes' and allocate certain resources to specific 'Classes'.

If set to '0', the terminal will not work normally on any system, set this field accordingly, the default is displayed above. i.e. 0xFFFF.

33.4.5 SC Acquisition Timer

If the Subscriber Class (SC) of the terminal has been set, the terminal will always attempt to log onto a cell that supports this class.

The Field Value determines the period of time that the terminal will search for a cell that support this class, after which it will register on the best cell even though there is no SC match.

The range is 0 to 300 seconds, the default is 30 seconds.

33.4.6 MLE Sleep Timer

The Field Value entry for the Mobile Link Entity (MLE) defines the period of time the terminal waits between iterations of frequency list scanning.

Upon power up, or whenever the terminal is not attached to any cell and there are no known suitable neighbour cells, the terminal begins to scan the frequencies.

After having exhausted all the lists, the terminal waits a provisioned amount of time before beginning the process again from the first list. This time needs to be carefully balanced between the need to save battery life and the need to find a system quickly after having lost coverage.

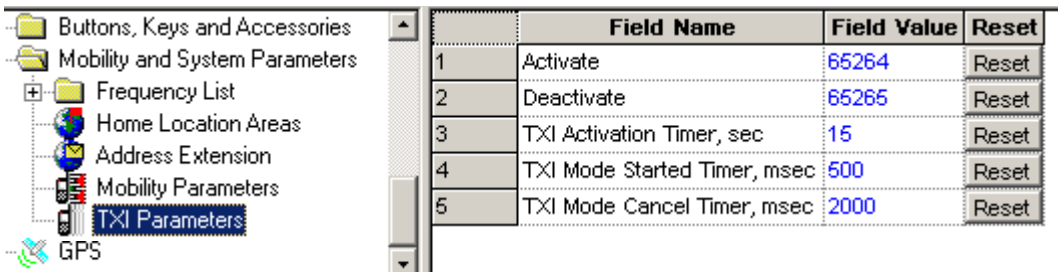
The range is 0 to 60 seconds, the default being 5 seconds.

33.4.7 Type 2 Reselection Enabled

This field needs to always be enabled except for terminals that are working on legacy Dimetra-P releases.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

33.5 TXI Parameters (Transmit Inhibit)



Allows setting up parameters of TXI status messages the terminal will send to the dispatcher upon activation/de-activation of the TXI (Transmit Inhibit) mode.

TXI mode, also called terminal RF (Radio Frequency) SA (Sensitive Area) Mode, is a special terminal mode where uplink transmission of any type is forbidden except an Emergency call.

The TXI mode is activated by the terminal user in RF sensitive areas, (e.g. hospitals, airplanes, etc.), where safety can be jeopardized due to terminal uplink high radiation. When no danger to safety exists anymore (for instance if user leaves RF sensitive area), the user can de-activate TXI mode and return back to normal operation.

Note: If an emergency call caused TXI mode de-activation, no status message will be sent about TXI deactivation.

These are the same options available for the TXI One Touch Button option, see paragraph 14.3.5. Both menus are linked and if a field value is changed in either menu, it will automatically be changed at the other. It has the following options:

33.5.1 Activate

When TXI is enabled, the terminal can send a status message informing the dispatcher that it is in TXI mode and is receive only. The status message number is manually entered into this field and is not selectable from the Status List entries.

33.5.2 Deactivate

When TXI is disabled, the terminal can send a status message informing the dispatcher that it is in now in normal operating mode. The status message number is manually entered into this field and is not selectable from the Status List entries.

33.5.3 TXI Activation Timer

This is the time delay between TXI being selected and TXI actually starting, it allows time for all on going procedures to be completed before transmission is actually blocked.

The range is from 1 to 30 seconds and the default is 15 seconds.

33.5.4 TXI Mode Started Timer

The entry in this field sets the time that the button must remain pressed before the TXI mode is started.

The range is from 1 to 5000 msecs and the default is 500 msecs.

33.5.5 TXI Mode Cancel Timer

The entry in this field sets the time that the button must remain pressed before the TXI mode is cancelled and the terminal reverts to normal operation.

The range is from 1000 to 5000 msecs and the default is 2000 msecs.

34 GPS

This autonomous GPS feature enables the terminal to send location reports.

Not only can the reports be sent to meet customer requirements, but they can also be triggered by events occurring through terminal us, such as emergency call initiation and power on/off etc.

The ‘Profile Menus’ define the parameters that are used by and when these events (such as selecting DMO) are triggered.

Other situations are:

- On Request.
- Specific events.
- Triggered after a time interval.
- Triggered at specific distance intervals.

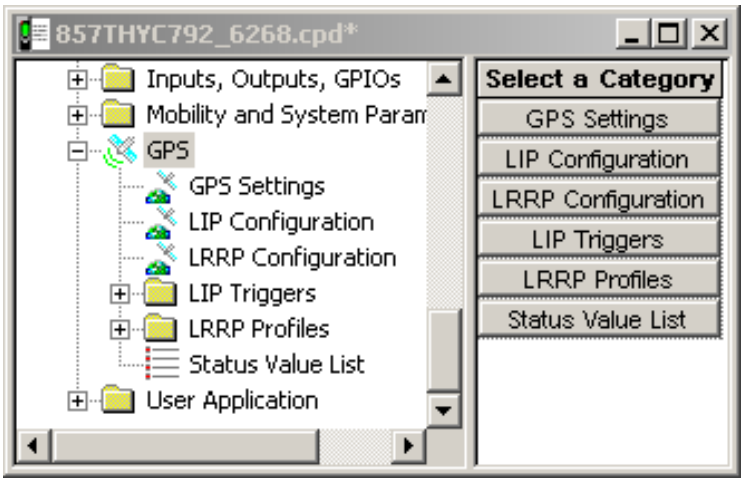
The reports are sent using a proprietary protocol, via the SDS transport layer, that also flags error conditions.

The user’s involvement with the operation of this feature is minimal, although the terminal does provide indications of the operational status of the GPS feature.

The GPS feature can be enabled/disabled via the CPS and its event times/responses can be configured in the GPS menu options. Configuration can also be done ‘Over the Air’ and this new information will overwrite the CPS configuration.

All data requests and configuration commands received over the air are authenticated by checking the ISSI of the sender of the source file, if the ISSI is wrong, the file will be rejected.

Note: Under the worst possible scenario of non emergency use, this feature will drain the battery by up to 10%.

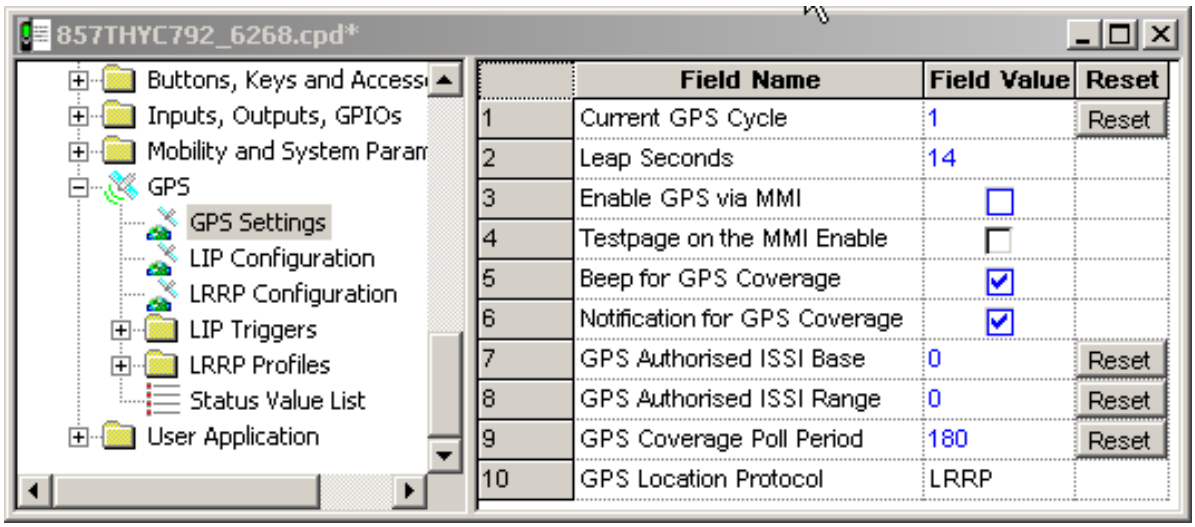


This menu has 6 sub menus, made up of a GPS Settings sub menu. The Profile sub menus have the same 1 to 8 Field Name options, but 4 have 9 or 10 options, these 4 sub menus are:

- Normal Periodic Profile.
- Emergency Periodic Profile.
- MS Moved Profile.
- Low Battery Profile (not relevant for the mobile terminal).

Note: This section will cover in detail the GPS Settings and the Emergency 1 Profile sub menus and only the different Field Name options of the above 4 Profiles.

34.1 GPS Settings



This menu is used for setting the common GPS functionality and has the following options:

34.1.1 Current GPS Cycle

At the end of 1,024 weeks (every 19.75 years approx.) the GPS 'Week Cycle' starts again at zero.

Zero, also used to identify the first cycle, was from the 6th January 1980 until the 22nd August 1999. We are now in the 2nd period or cycle 1 and this runs until 2019.

The entry for this field is 1.

34.1.2 Leap Seconds

Specifies the difference between GPS time and UTC time. This parameter is used to synchronize both time systems in the radio.

The range is 0 to 65.553 seconds, the default is 14 seconds.

34.1.3 Enable GPS via MMI

If this option is enabled, it is then possible for the user to enable/disable the GPS feature.

34.1.4 Test Page on the MMI Enable

Note: Not editable via Customer CPS.

34.1.5 Beep for GPS Coverage

This option enables/disables the terminal's audio indications for GPS coverage.

34.1.6 Notification for GPS Coverage

Enable/disable the visual notification for loss of GPS coverage.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

34.1.7 GPS Authorised ISSI Base

This ISSI is the first in the range of valid ISSIs that the terminal will recognise when checking for authorisation after receiving a location service request. The terminal checks the calling party ISSI.

34.1.8 GPS Authorised ISSI Range

The number entered in this Field Value defines the range of valid consecutive ISSIs from the GPS Authorised ISSI Base.

34.1.9 GPS Coverage Poll Period

This option displays the time period in seconds after which the GPS coverage is checked and the display icon updated accordingly.

The range for this setting is 0 - 2147483, the default is 180.

34.1.10 GPS Location Protocol

Selects the over-the air location protocol used for location requests and location reports.

There are 2 possible choices:

- **LIP** - Location Information Protocol (ETSI standard)
- **LRRP** - Location Request Response Protocol (non ETSI standard)

To select the option, put the pointer into the field value, click on the arrow, and drag the pointer to the desired option.

34.2 LIP Configuration

34.2.1 Send Initialization Request

If enabled, the radio sends an Initialization Request after it is powered up and registered in the network.

34.2.2 Destination ISSI

This is the destination Individual Short Subscriber Identity (ISSI) for Location Information Protocol (LIP) reports. Usually this is the address of the LIP Location Server.

34.2.3 Min Reporting Interval

Note: The GPS Location Protocol must be set to **LIP** to make this field editable.

Duration in seconds which is not underrun between 2 successive LIP location reports.

The range is from 10 to 5280 seconds and the default is 10 seconds.

Related fields:

The GPS Profiles

34.2.4 LIP Max Data Age

Note: The GPS Location Protocol must be set to **LIP** to make this field editable.

Specifies the acceptable maximum age of location data in seconds.

The range is from 0 to 254 seconds and the default is 60 seconds.

Related fields:

The GPS Profiles

34.2.5 Max Respond Time

Note: The GPS Location Protocol must be set to **LIP** to make this field editable.

Specifies the maximum duration in seconds the GPS system has to acquire location data.

The range is from 0 to 3780 seconds and the default is 0 seconds.

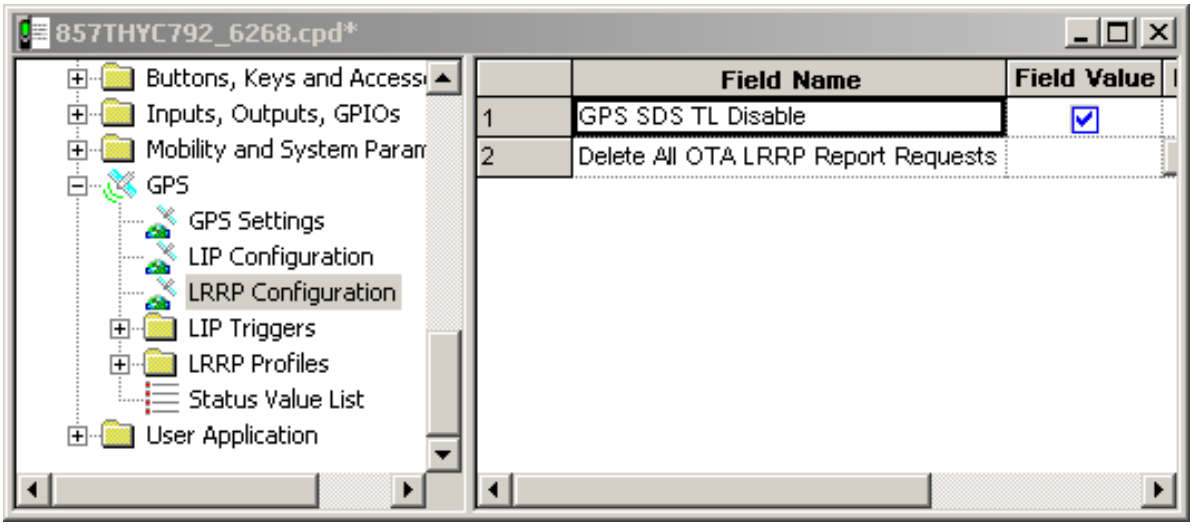
Related fields:

The GPS Profiles

34.2.6 Delete All OTA LIP Location Report Requests

Removes all Over-the-Air (OTA) Location Information Protocol (LIP) report requests (triggered requests) received over the air. This is clean up measure to delete orphaned requests that are no longer useful.

34.3 LRRP Configuration



34.3.1 GPS SDS TL Disable

This field refers to location data transmissions via SDS (Short Data Services).

All location data transmissions will use SDS type 4, and no other transport mechanism.

If SDS TL Disable is checked, the PI for SDS GPS without TL header will be used. Otherwise, the PI configured for SDS GPS with TL header will be used.

We recommend the default setting (box checked) because the message over the air is shorter.

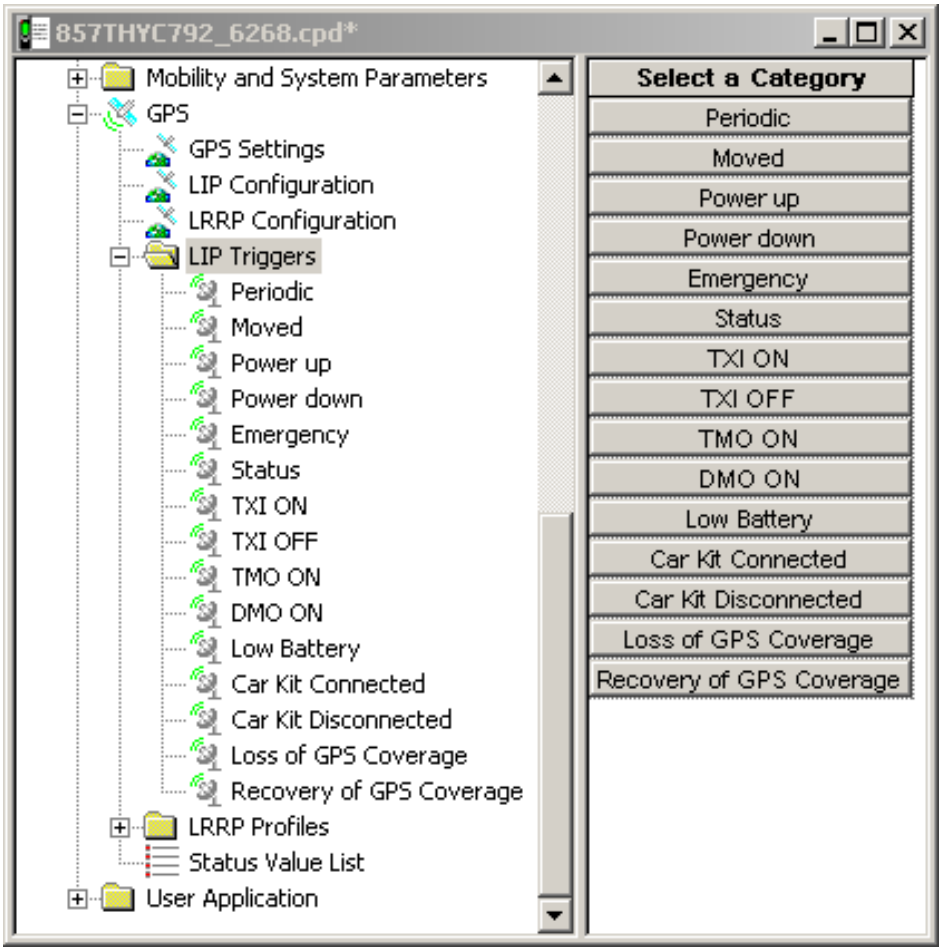
34.3.2 Delete All OTA LRRP Report Requests

Removes all OTA Location Request/Response Protocol (LRRP) report requests (triggered requests) received over the air. This is a clean up measure to delete orphaned requests that are no longer useful.

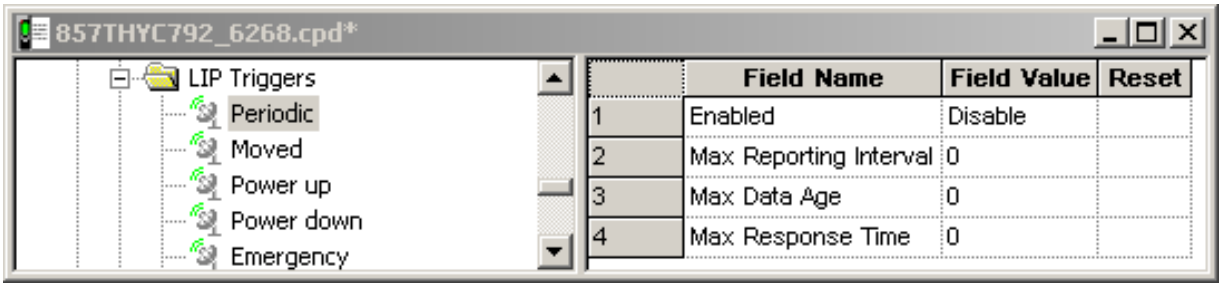
Clear all requests by pressing the Reset button.

34.4 LIP Triggers

Triggering of location reports can be caused by various different reasons, and for each such reason there will be a corresponding set of values for the related parameters



All the Triggers are described by 7 different fields.



34.4.0.1 Enables/disables the GPS Event Location.

The options are:

- · **Enabled** - Location reporting on occurrence of this event is enabled (subject to other codeplug settings).
- · **Disabled** - Location reporting on occurrence of this event is disabled.

To assign a setting, put the pointer into the field value, click on the arrow, and drag the pointer to the desired setting.

This field is specified the same way for all the LIP Triggers.

34.4.0.2 Max Reporting Interval

This is the interval at which periodic Location Reports are sent.

34.4.0.3 Max Data Age

Indicates the default maximum age allowed for data in Location Report message for triggered reports.

34.4.0.4 Max Response Time

Specifies maximum duration the GPS system has to acquire location data.

34.4.0.5 Max Reporting Distance

Defines the distance interval at which distanced based Location Reports are sent when not inserted in a DIgital Car Kit.

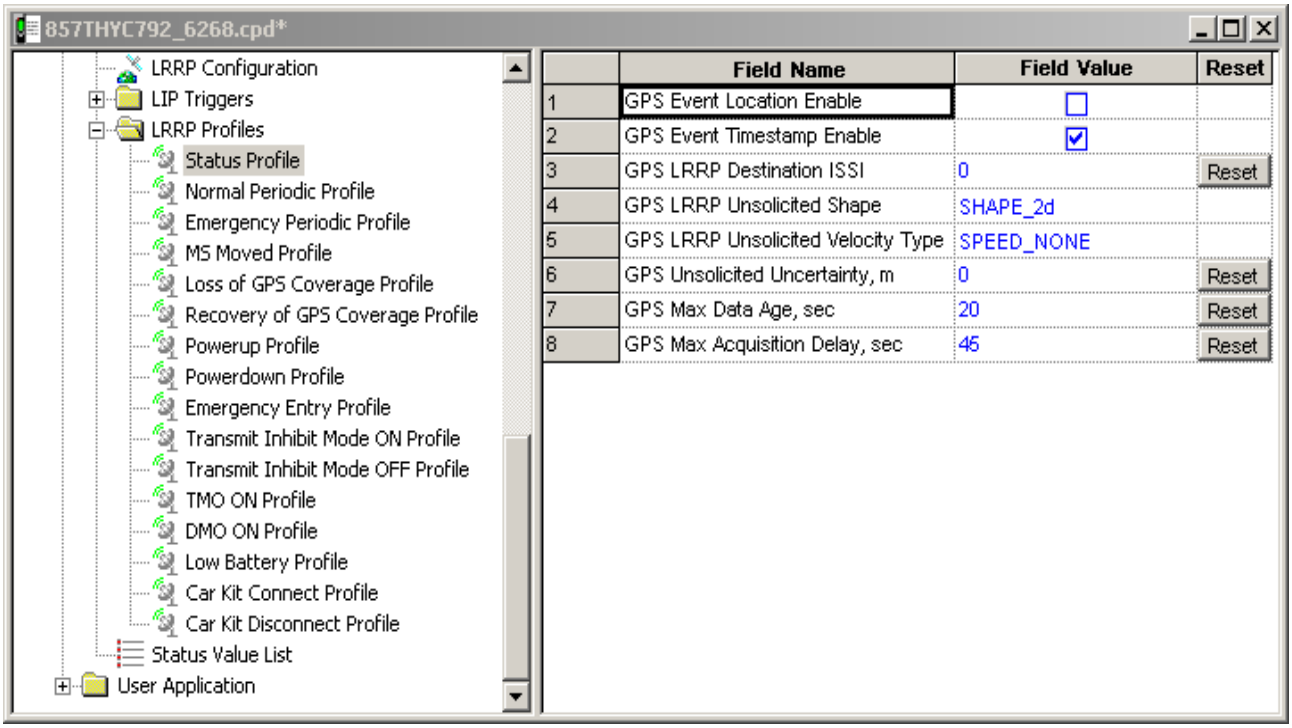
34.4.0.6 Distance Check Interval

Maximum interval (in seconds) at which radio check its position for possition based Location Reports when not inserted when is not inserted in a Digital Car Kit.

34.4.0.7 Low Battery Level

Indicates the percentage of battery level triggering the "Low Battery" condition.

34.5 LRRP Profiles



34.5.1 GPS Event Location Enable

Enables/disables the GPS Event Location.

- If Enabled, the Unsolicited Location Report on occurrence of this event is enabled (subject to other codeplug settings).
- If Disabled, the Unsolicited Location Report on occurrence of this event is disabled.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

This field is an element in the codeplug structure for the Unsolicited Report Profiles. The actual value depends on the particular Profile.

34.5.2 GPS Event Timestamp Enable

Enables/disables the GPS Event Timestamp.

- If Enabled, Unsolicited Location Reports on occurrence of this event shall have timestamps.
- If Disabled, Unsolicited Location Reports on occurrence of this event shall NOT have timestamps.

This field is an element in the codeplug structure for Unsolicited Report Profiles; the actual value depends on the particular Profile.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

34.5.3 GPS LRRP Destination ISSI

This is the destination ISSI for Unsolicited Location Reports.

This field is an element in the codeplug structure for Unsolicited Report Profiles; the actual value depends on the particular Profile.

The range is any valid ISSI or NO_ISSI. (NO_ISSI is a reserved value outside the range of possible ISSIs, and only used to indicate that no ISSI has been assigned to the field in question.)

Type in the required value.

34.5.4 GPS LRRP Unsolicited Shape

This is the Shape to use for Unsolicited Location Reports:

- · SHAPE_2d: a two-dimensional (latitude and longitude) position.
- · SHAPE_3d: a three-dimensional (latitude, longitude and height) position.

This field is an element in the codeplug structure for Unsolicited Report Profiles; the actual value depends on the particular Profile.

To assign a setting, put the pointer into the field value, click on the arrow, and drag the pointer to the desired setting.

34.5.5 GPS LRRP Unsolicited Velocity Type

This is the Velocity Type to use for Unsolicited Location Reports:

- · No speed reported
- · Horizontal speed: gives the magnitude of the horizontal component of the velocity of a target entity.
- · Horizontal speed with high accuracy
- · Vertical speed: gives the magnitude of the vertical component of the velocity of a target entity.
- · Vertical speed with high accuracy
- · Horizontal and vertical speed
- · Horizontal and vertical speed with high accuracy

To assign a setting, put the pointer into the field value, click on the arrow, and drag the pointer to the desired setting.

This field is an element in the codeplug structure for Unsolicited Report Profiles; the actual value depends on the particular Profile.

34.5.6 GPS Unsolicited Uncertainty, m

This is the requested horizontal uncertainty to use for Unsolicited Location Reports. The value is a measure for the accuracy of the location determination.

This field is an element in the codeplug structure for Unsolicited Report Profiles; the actual value depends on the particular Profile. Type in the required value in meters.

If the requested uncertainty/accuracy is achieved from the GPS system, the report will be sent with the requested uncertainty/accuracy. If the requested uncertainty/accuracy is not achieved, the uncertainty/accuracy, which has been achieved is reported after expiration of the GPS Max Acquisition Delay.

If an uncertainty value of 0 is defined, then no accuracy information is requested and the unsolicited location report will not contain any accuracy information (shape type is point_2d or point_3d). If an uncertainty value not equals to 0 is defined, then an accuracy information is provided within the unsolicited location report (shape type is ellipse_2d or ellipse_3d).

34.5.7 GPS Max Data Age, sec

Indicate the default maximum age (in seconds) allowed for data Location Report message for triggered reports.

34.5.8 GPS Max Acquisition Delay, sec

Indicates the default maximum time (in seconds) allowed for the acquisition of the current location.

Type in the value. This value will be mapped to an actual value as shown in the second column of the mapping table.

At the end of the specified acquisition period, the following will happen:

- · If the terminal has a signal, the terminal will get the LRRP report with Location Data.
- · If the terminal has not acquired a fix to the requested accuracy, the terminal will get the LRRP report without location data and with an error indication plus the reason.

34.5.9 GPS Idle Report Period, sec

This is the interval (in seconds) at which periodic Locarion Reports are sent outside Emergency Mode.

34.5.10 GPS Emergency Report Period, sec

This is the interval at which periodic Location Reports are sent in Emergency Mode.

34.5.11 GPS Report Distance , m

Defines the distance interval at which distance-based Location Reports are sent when not inserted in Digital Car Kit.

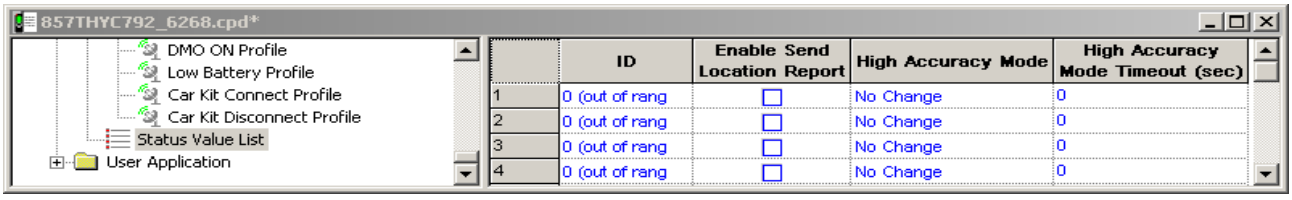
34.5.12 Distance Check Interval

Maximum interval seconds at which radio its position for position-based Location Reports when not inserted in Digital Car Kit.

34.5.13 GPS Low Battery Level

Indicates the percentage of battery level triggering the "Low Battery" condition.

34.6 Status Value List



34.6.1 ID

This is the ID of pre-configured Status value.

34.6.2 Enable Send Location Report

If enabled, a location report will be sent when the status value is sent.

34.6.3 High Accuracy Mode

Specifies the behavior of the radio for the GPS accuracy mode in case of sending an outgoing Status message via the user menu.

There are 3 possible choices:

- · No Change - Radio keeps the current GPS accuracy mode
- · Enter - Radio enters the GPS high accuracy mode (high power consumption)
- · Leave - Radio leaves the GPS high accuracy mode and enters the normal accuracy mode (low power consumption)

To select the option, put the pointer into the field value, click on the arrow, and drag the pointer to the desired option.

34.6.4 High Accuracy Mode Timeout (sec)

Duration when High Accuracy Mode should be left after it has been entered due to a Status message.

35 Call-Out

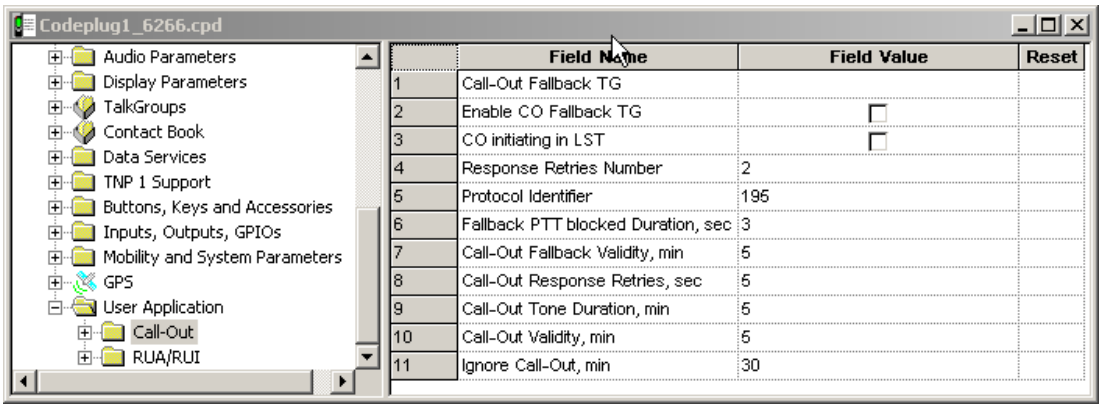
The purpose of a Call-Out message is to alert one or many users when an important incident requires their immediate attention. This feature has second highest priority after Emergency Call so all other calls are going to be ignored by the terminal.

The alert message can be sent either to addressed by an (Individual Short Subscriber Identity) ISSI or sent to a group addressed by a Group Short Subscriber Identity (GSSI).

When the user receives a Call-Out alert, this means that the Call-Out has started and the radio will interrupt current services to attend to the Call-Out alert without any further delay.

We can list four types of the Call-Out alerts:

- Normal call-out
- Storm plan - it is sent to a group several time to raise reliability. User can only accept the Call-Out by pressing any button and is moved to information phase (soft keys are not labelled).
- Fallback Mode - it includes only voice communication. It can be cleared manually
- Test Call-Out - dispatcher has the ability to test this feature. Radio is generating the tone with “Call-Out Test” on the display. Only one softkey is enabled “Test OK” to confirm and to clear the test.



35.1 Call-Out - General

35.1.1 Call-Out Fallback TG

Choose the Talkgroup for the Call-Out in Fallback Mode.

To select the option, put the pointer into the field value, click on the arrow, and drag the pointer to the desired option.

35.1.2 Enable CO Fallback TG

If enabled, Talkgroup can be choose for the Fallback Mode. If this field is disabled, the associated talkgroup will be selected.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

35.1.3 CO initiating in LST

If enabled, user can send Call-Out alerts in Local Site Trunking.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

35.1.4 Response retries number

Defines how many times radio is going to redeliver a failed Alert Response Message.

Type the number in the textbox (range 0-4).

35.1.5 Protocol Identifier

This is unique ID that specifies Call-Out service. It is the same for all the alerts.

Type the number in the textbox (range 195-254).

35.1.6 Fallback PTT blocked duration, sec

It defines time which the user is not allowed to use PTT after initiating the Call-Out Mode.

Type the desired number in the textbox. Default value for this option is 3 (range 0-30).

35.1.7 Call-Out Fallback Validity, min

Defines the period of time within which an ongoing Call-Out alert will be automatically cleared. Timer will restand upon transmitting or receiving voice.

Type the desired number in the textbox. Default vaule is 5 minutes (range 0-10).

35.1.8 Call-Out Response Retries, sec

Defines the time between each sending attempt upon Alert Response Message failed delivery.

Type the desired number in the textbox. Default vaule is 5 minutes (range 0-16).

35.1.9 Call-Out Tone Duration, min

Defines how long the tone is on for the Call-Out alerts. After this period even if the tone is off the visual display is still on.

Type the desired number in the textbox.

35.1.10 Call-Out Validity, min

Defines the time period of time that the Call-Out alert is valid. When the time is out Call-Out alert is cleared automatically. Timer will restart upon transmitting or receiving voice.

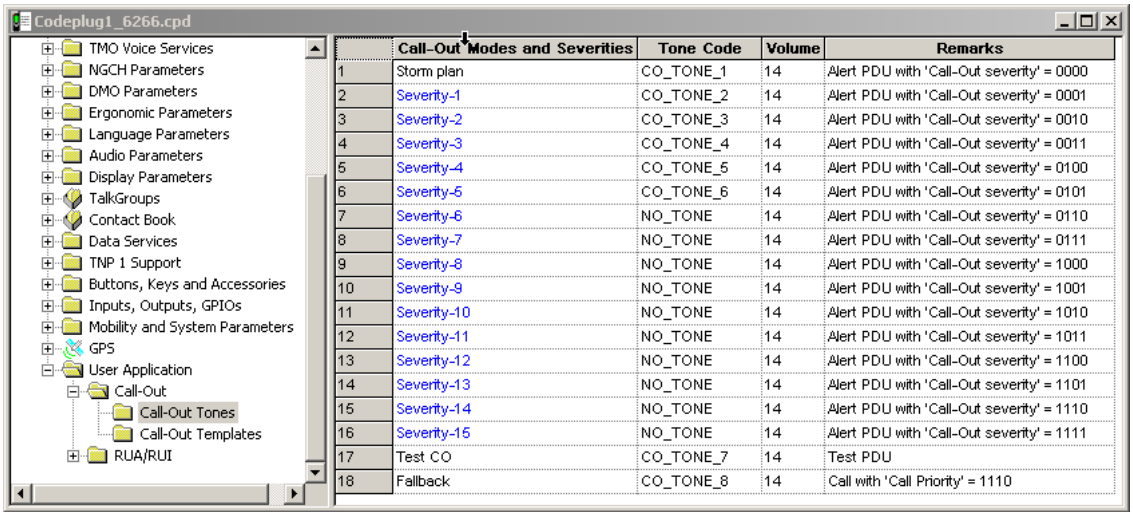
Type the desired number in the textbox. Default vaule is 5 minutes (range 0-10).

35.1.11 Ignore Call-Out, min

Defines the period of time when the will ignore the messages rataled to the alert that was rejected or exited before.

Type the desired number in the textbox. Default vaule is 5 minutes (range 0-30).

35.2 Call-Out Tones



	Call-Out Modes and Severities	Tone Code	Volume	Remarks
1	Storm plan	CO_TONE_1	14	Alert PDU with 'Call-Out severity' = 0000
2	Severity-1	CO_TONE_2	14	Alert PDU with 'Call-Out severity' = 0001
3	Severity-2	CO_TONE_3	14	Alert PDU with 'Call-Out severity' = 0010
4	Severity-3	CO_TONE_4	14	Alert PDU with 'Call-Out severity' = 0011
5	Severity-4	CO_TONE_5	14	Alert PDU with 'Call-Out severity' = 0100
6	Severity-5	CO_TONE_6	14	Alert PDU with 'Call-Out severity' = 0101
7	Severity-6	NO_TONE	14	Alert PDU with 'Call-Out severity' = 0110
8	Severity-7	NO_TONE	14	Alert PDU with 'Call-Out severity' = 0111
9	Severity-8	NO_TONE	14	Alert PDU with 'Call-Out severity' = 1000
10	Severity-9	NO_TONE	14	Alert PDU with 'Call-Out severity' = 1001
11	Severity-10	NO_TONE	14	Alert PDU with 'Call-Out severity' = 1010
12	Severity-11	NO_TONE	14	Alert PDU with 'Call-Out severity' = 1011
13	Severity-12	NO_TONE	14	Alert PDU with 'Call-Out severity' = 1100
14	Severity-13	NO_TONE	14	Alert PDU with 'Call-Out severity' = 1101
15	Severity-14	NO_TONE	14	Alert PDU with 'Call-Out severity' = 1110
16	Severity-15	NO_TONE	14	Alert PDU with 'Call-Out severity' = 1111
17	Test CO	CO_TONE_7	14	Test PDU
18	Fallback	CO_TONE_8	14	Call with 'Call Priority' = 1110

As for every massege or call, Call-Out has its own defined tones.

35.2.1 Call-Out Modes and Severities

Indicates the number of tone that can be assigned to any Call-Out Alert. There are three alerts that are already named. 15 of the tones are editable by the Service Provider.

35.2.2 Tone Code

Tone code that is assigned to the Severity number. It can be changed by the Service Provider.

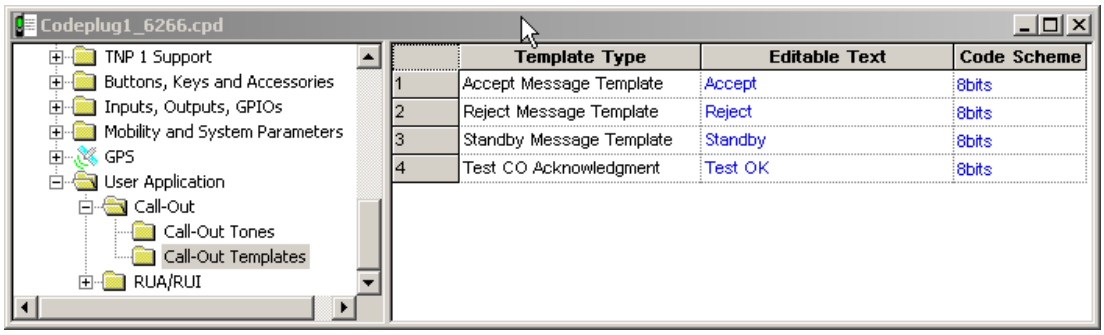
35.2.3 Volume

Indicates how loud the tone is going to be played.

35.2.4 Remarks

Describes what will be played.

35.3 Call-Out Templates



	Template Type	Editable Text	Code Scheme
1	Accept Message Template	Accept	8bits
2	Reject Message Template	Reject	8bits
3	Standby Message Template	Standby	8bits
4	Test CO Acknowledgment	Test OK	8bits

Describes 4 responds that are given to the user when he receives the Call-Out alert.

Chapter 4

DATA CONNECTION

1 Introduction

This chapter will give a guideline on how to connect a PC or desktop computer, running either Windows 2000® or Windows XP®, to a terminal to enable the transfer of packet data.

Note: When the computer is being connected to the terminal, **the terminal must be powered off**. Powering up the terminal after connection will initiate the 'Handshake' procedure between the computer and terminal.

2 Status Message

Status messaging is a 'Point to Point' short data service terminal application that enables a user to transmit predefined status messages to either a default location such as a dispatcher, or to a targeted user (Target Status).

The status message sent is actually a number (the status message ID) that is associated with the message. The message and its ID must be preprogrammed in both the sender and receiver equipment for the transfer to work correctly.

To be able to use this feature, it must first be enabled via the CPS - see Chapter 3, Paragraph 14.2 "Status".

3 Mail Message (SMS)

Mail messageing is an application that enables the terminal to send and receive text messages.

To be able to use this feature, it must first be enabled via the CPS - see Chapter 3, Paragraph 14.9 "MS User Application Support Pre-defined Template", Paragraph 14.10 "Mail In", & Paragraph 14.11 "Mail Out".

4 Short Data Service (SDS/PEI)

The Short Data Service (SDS) and the Periferal Equipment Interface (PEI) is another feature of the terminal's data service. Instead of using the MMI (Man Machine Interface), this uses AT commands to pass data via the terminal's RS232 port.

4.1 SDS/PEI Setup Procedure

4.1.1 Introduction

To use this service, a terminal must be connected to a standard computer via its RS232 port and the appropriate data cable/box. See Chapter 1 for the data accessories associated with the terminal type being used.

Note: Ensure no other application is using the computer port.

The computer may be configured to work on the company's LAN and must now be re-configured to work with the terminal on the radio network.

As the computer is normally working on the company LAN it contains security software that:

- Restricts access
- Is anti virus
- Is a fire wall

If the computer is running something like 'BlackICE', the computer will never work with the terminal. This application must be stopped for the duration that the computer is being used with the terminal. It may also be necessary to stop other applications, or change their default settings.

To stop applications follow the path:

Start/Settings/Control Panel/Administrive Tools/Services.

This window displays the applications running on the computer and from which they can be stopped.

4.1.2 Setting up a new Modem (Windows 2000®)

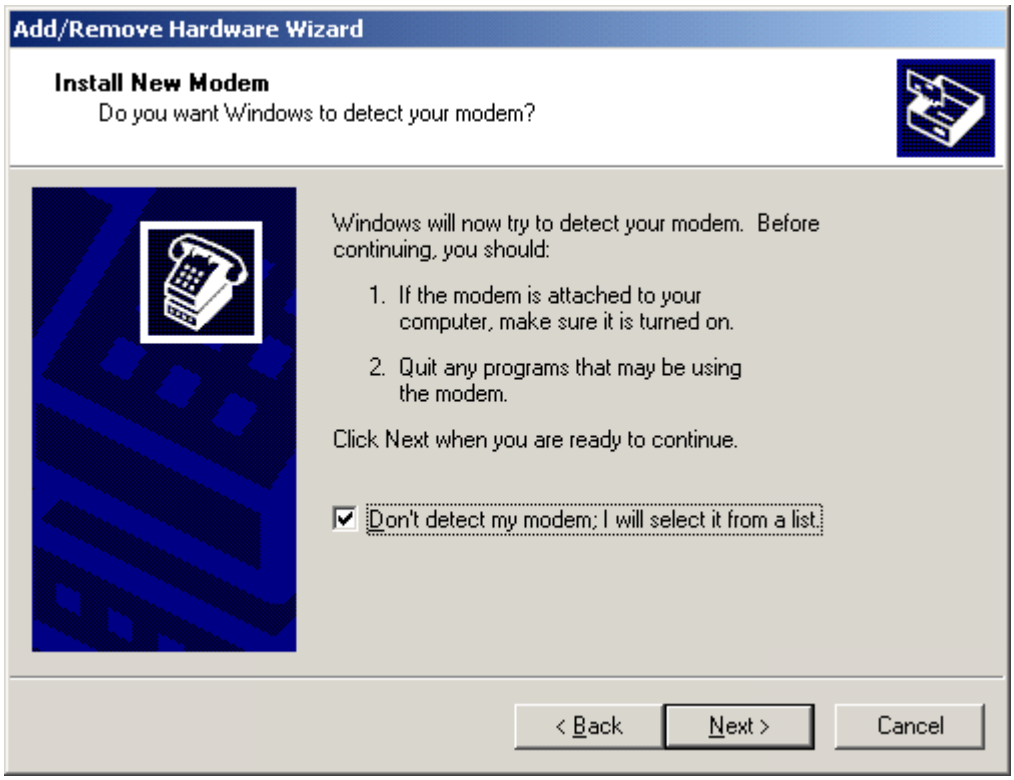
At the terminal do the following:

1. Connect the data cable to the terminal's data port.
2. Connect the other end of the data cable to the computer.
3. Power up the terminal
4. Via the menu, select either 'Voice and Data' or 'Data' mode option.

At the computer select:

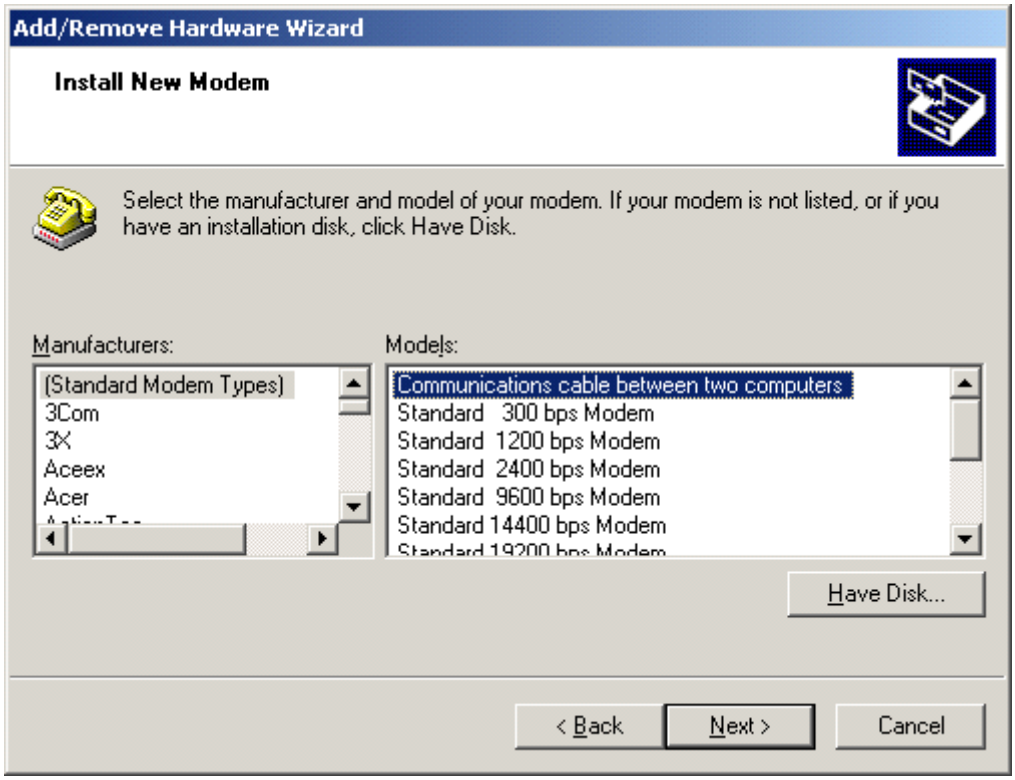
Start->Settings ->Control Panel ->Phone and Mode Options (enter dialing code if asked)

Under the modems tag select ‘Add’.



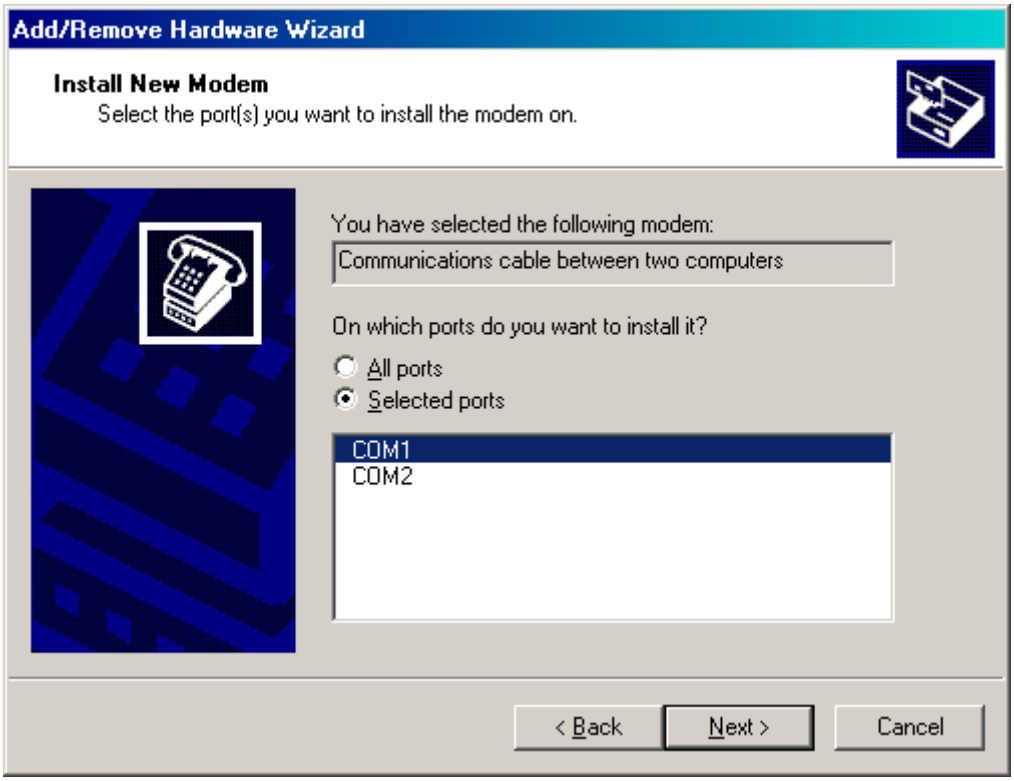
Check ‘Don’t Detect Modem’ -> Next

Select the communication option ‘Standard Modem Types’.

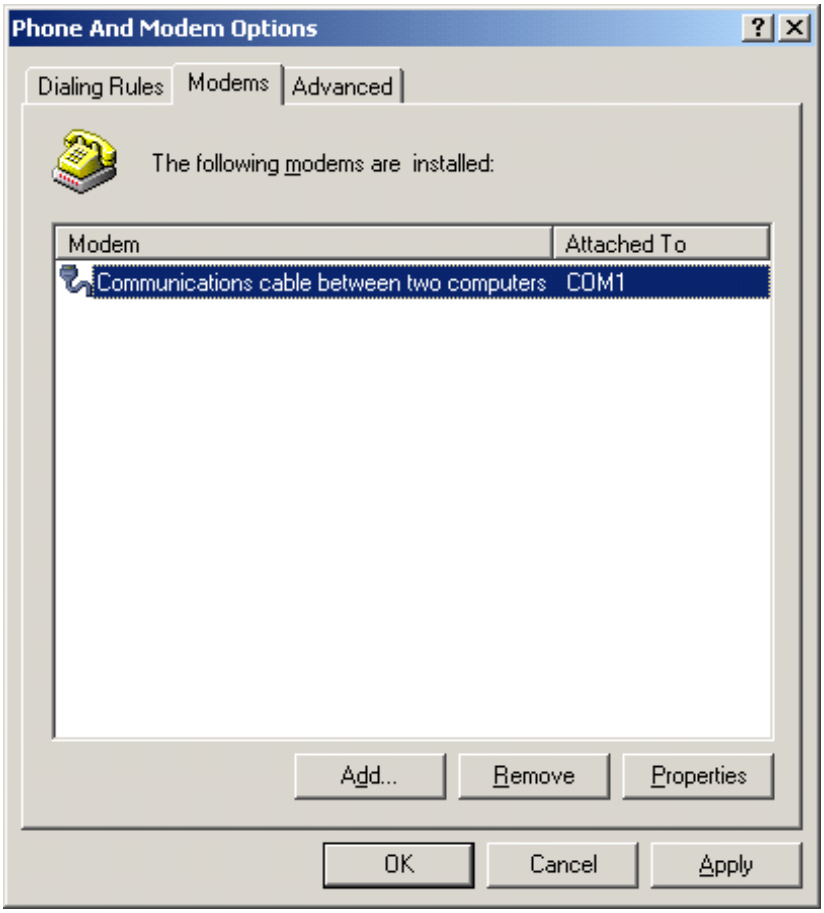


Select ->Next.

Select the communication port that will be used.



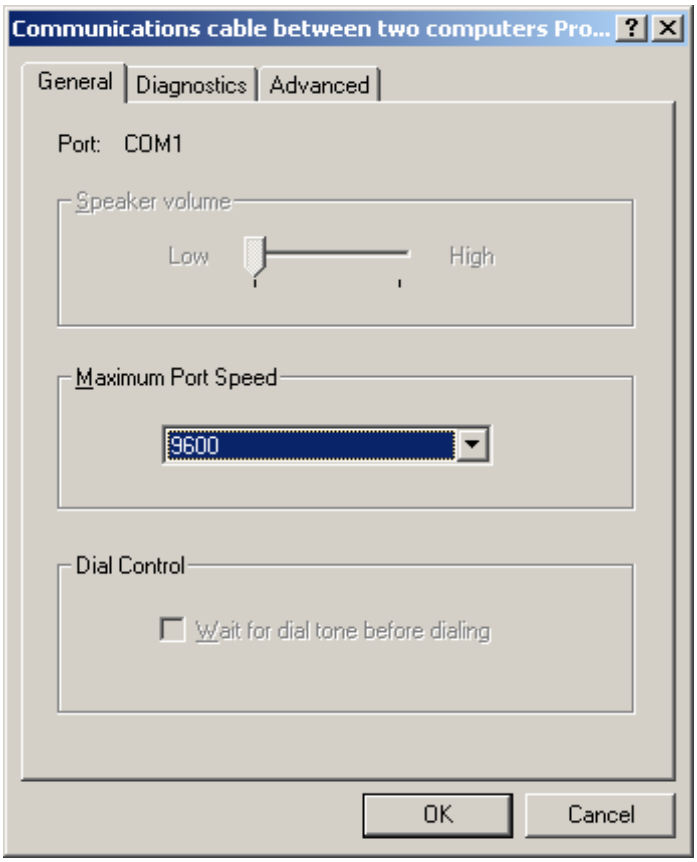
Select ->Next



Select ->Next.

Select ->Finish.

After this returns, select the newly added ‘Communictions Between Two Computers’.



Select ‘Properties’ and change the ‘Maximum Port Speed’ to 9600.

Select ->OK.

4.1.3 Setting up a new Network Connection (Windows 2000®)

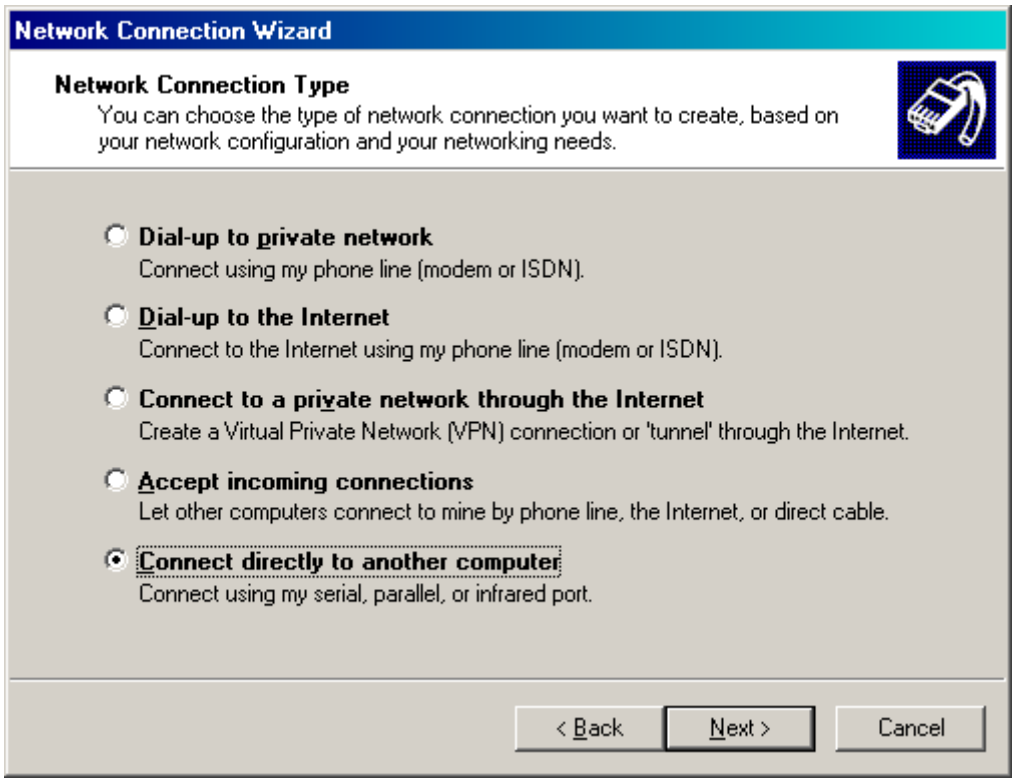
At the computer select:

Start->Settings ->Control Panel ->Network and Dial-up Connections

Select - >Make a New Connection.

Select ->Next.

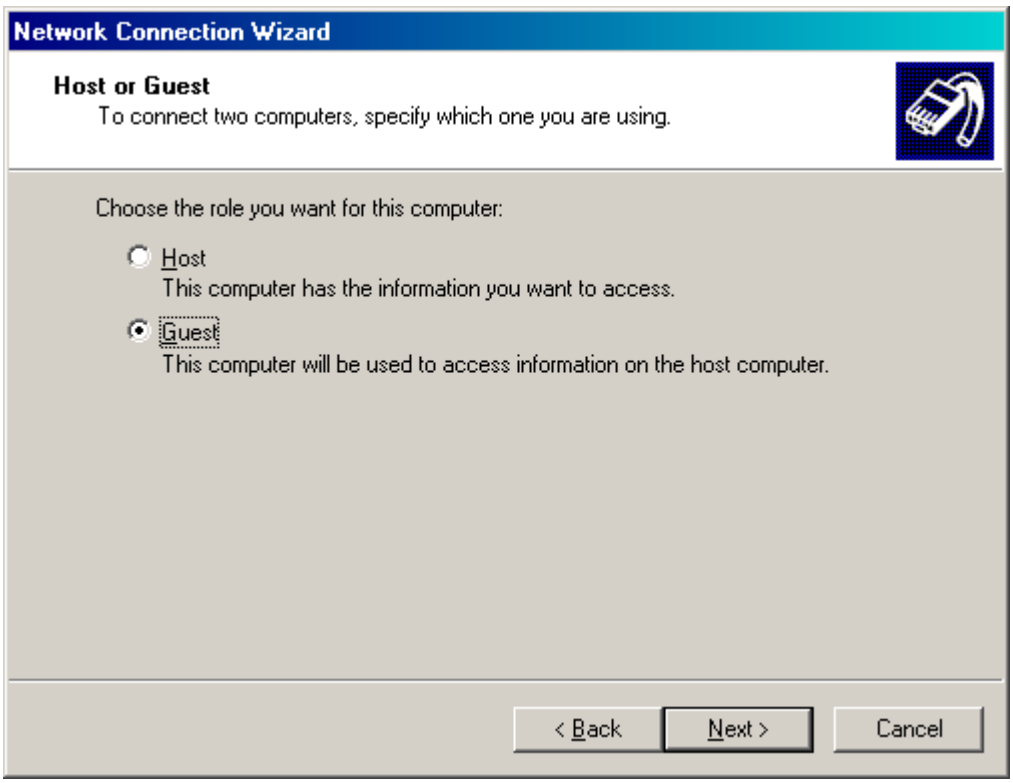
This will display the 'New Connection Wizard' window.



Choose the option ‘Connect Directly to another Computer’.

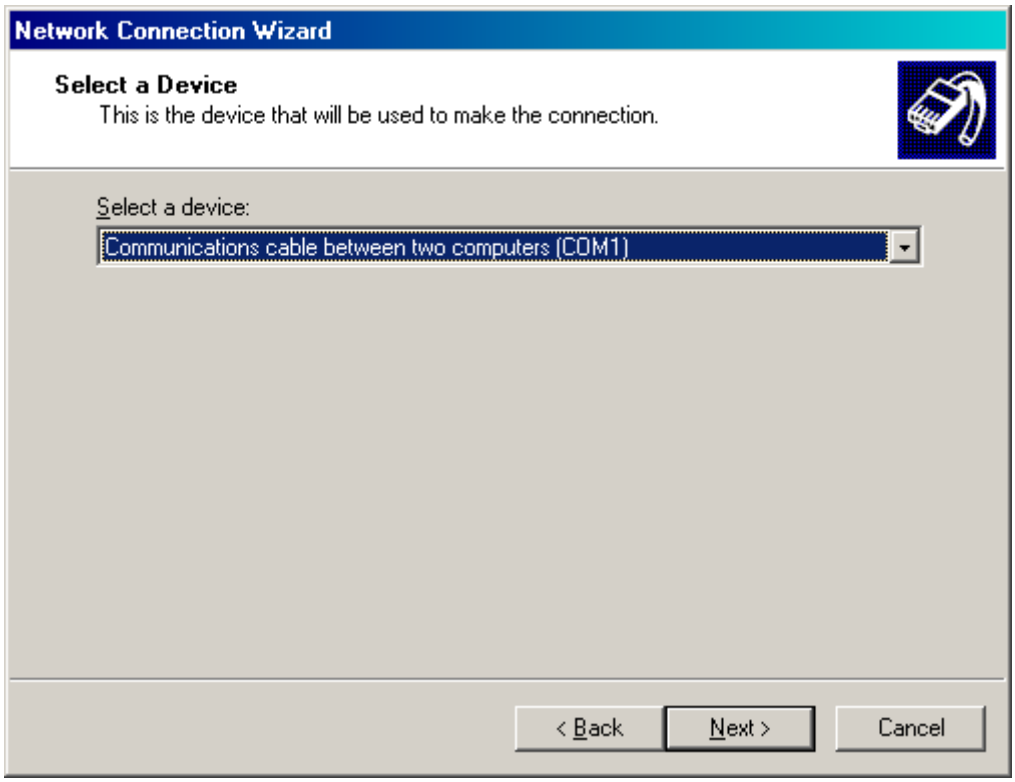
Select ->Next.

The ‘Host or Guest’ window will be displayed.



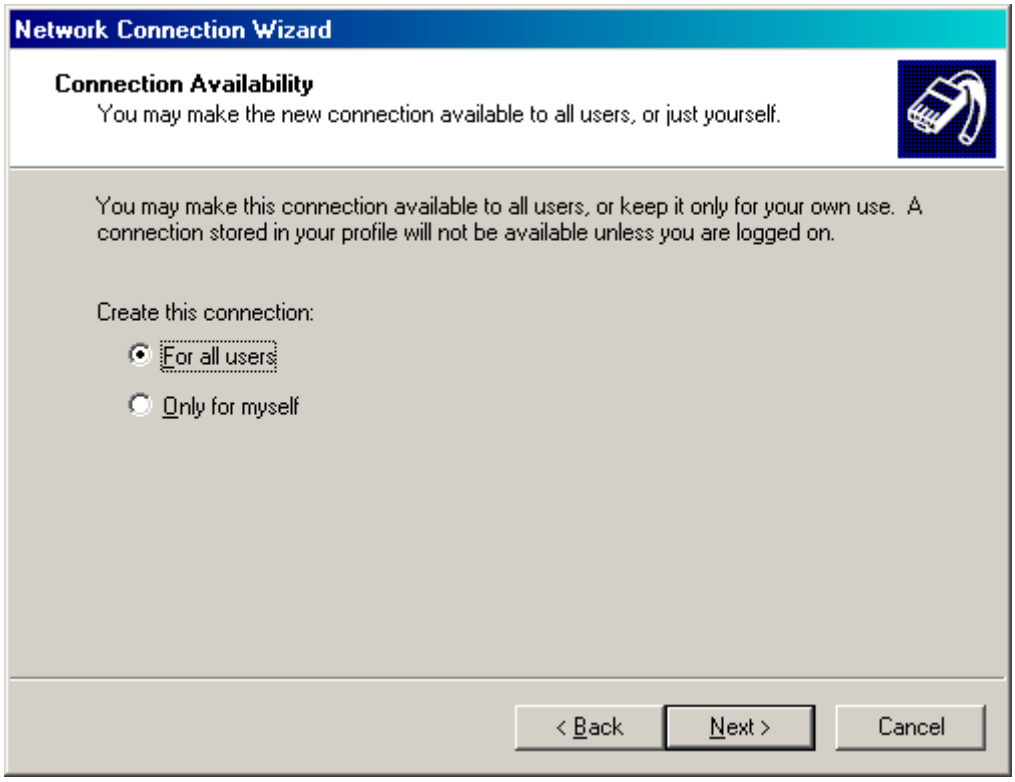
Choose the ‘Guest’ option as the radio system is the host.

Select ->Next.

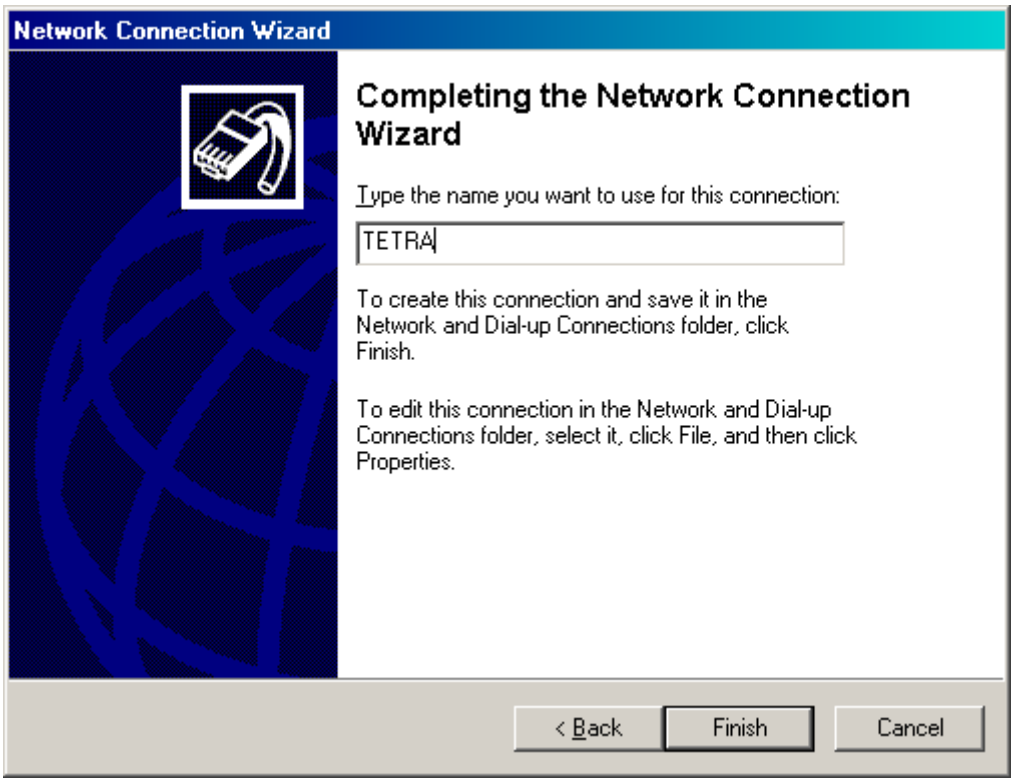


Select the appropriate option.

Select ->Next.



Select ->Next

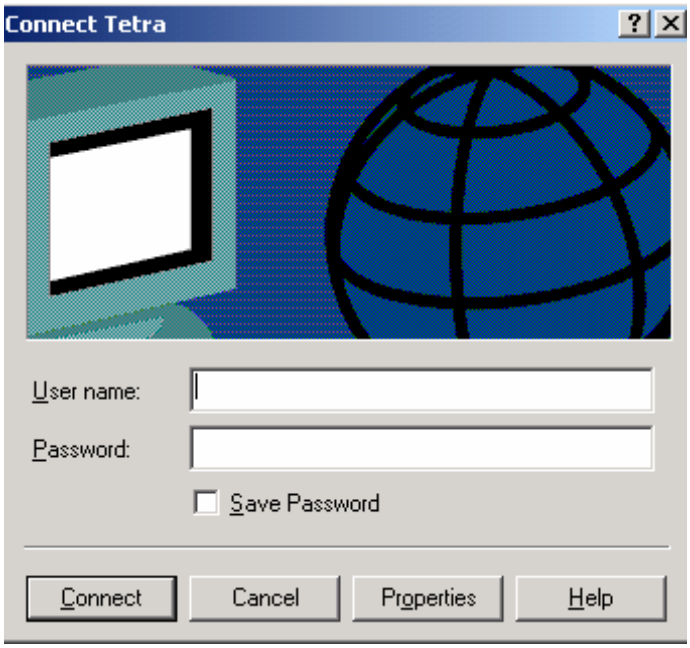


Enter a name or alias for the connection.

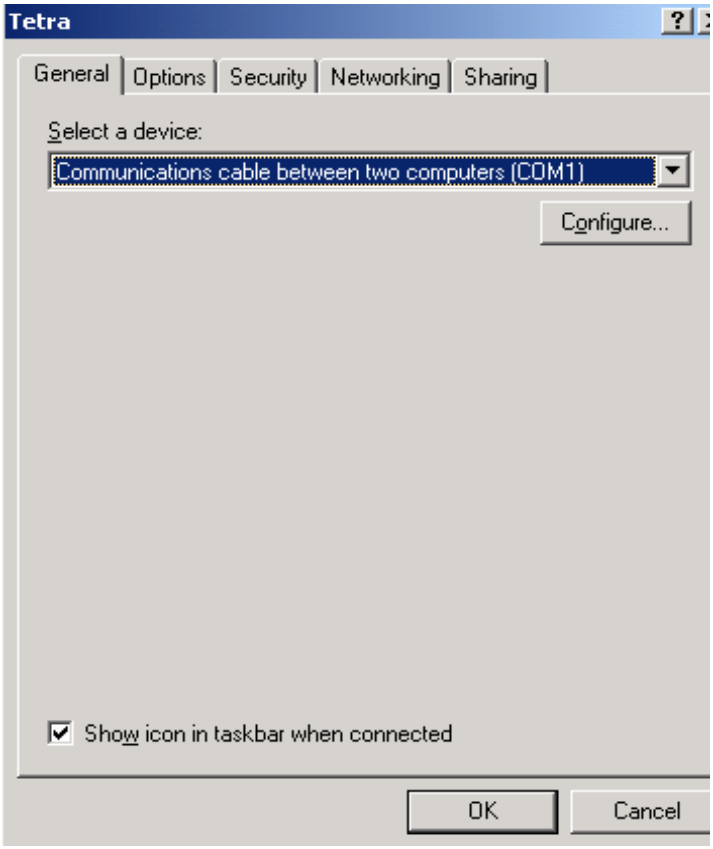
Select ->Finish.

4.1.4 Dial Up Connection Settings

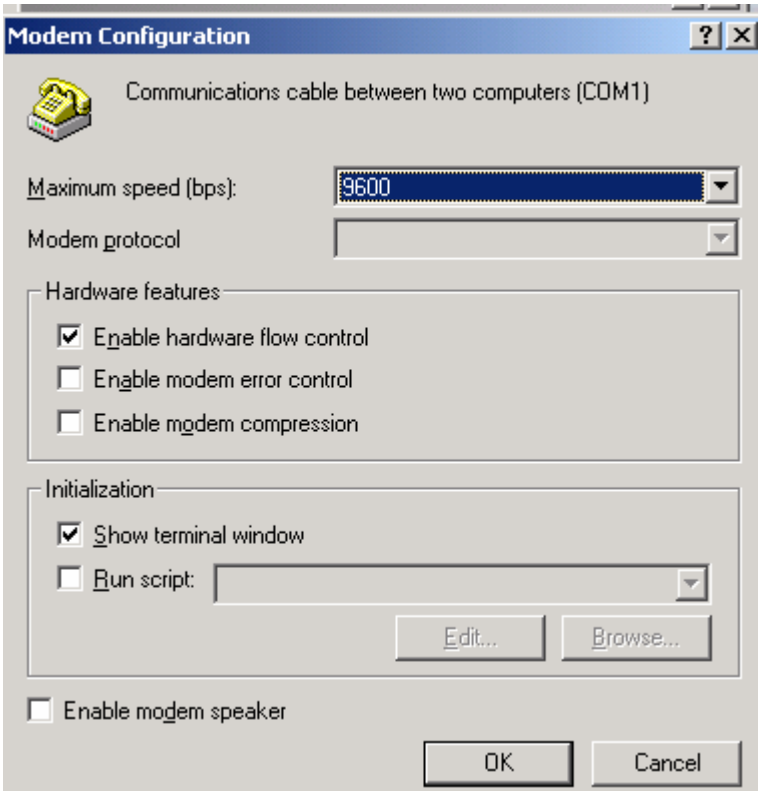
An easy method of doing this is to select the desktop icon to open the connection.



Select ->Properties.



Select ->General ->Configure.

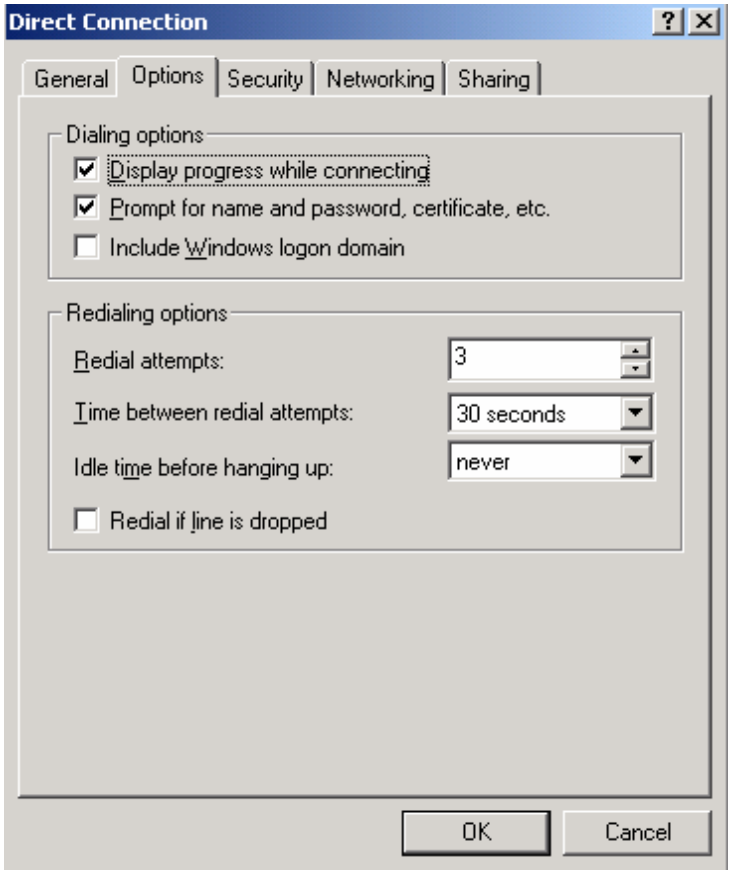


Select the ‘Enable Hardware Flow Control’ an ‘Show Terminal Window’ options.

Select->OK.

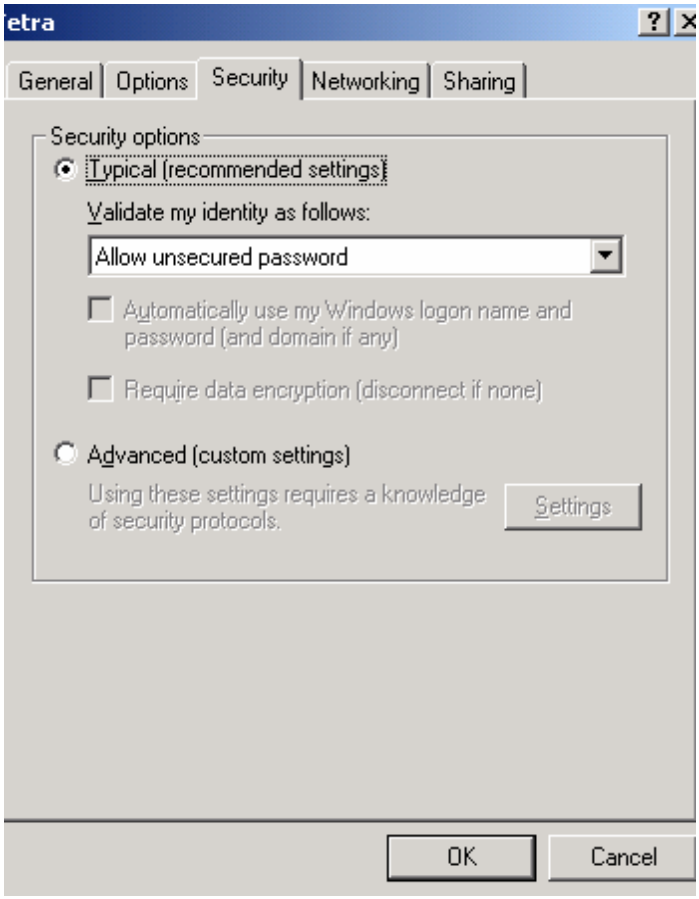
Select ->Options.

This will display the ‘Options’ window.



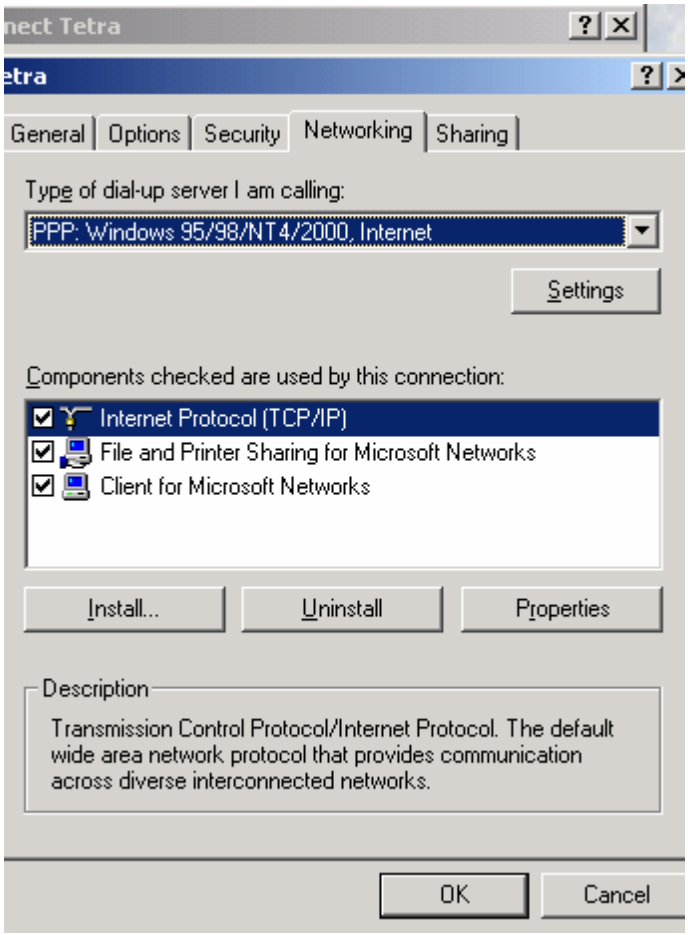
Set the displayed options.

Select ->Security



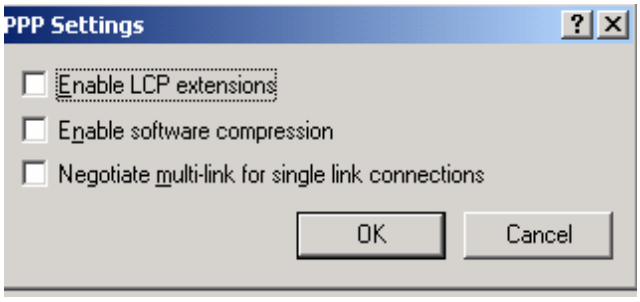
Choose the displayed settings.

Select ->Networking.



Ensure PPP: Windows® 95/98/NT4/2000, Internet is displayed.

Select ->Settings.

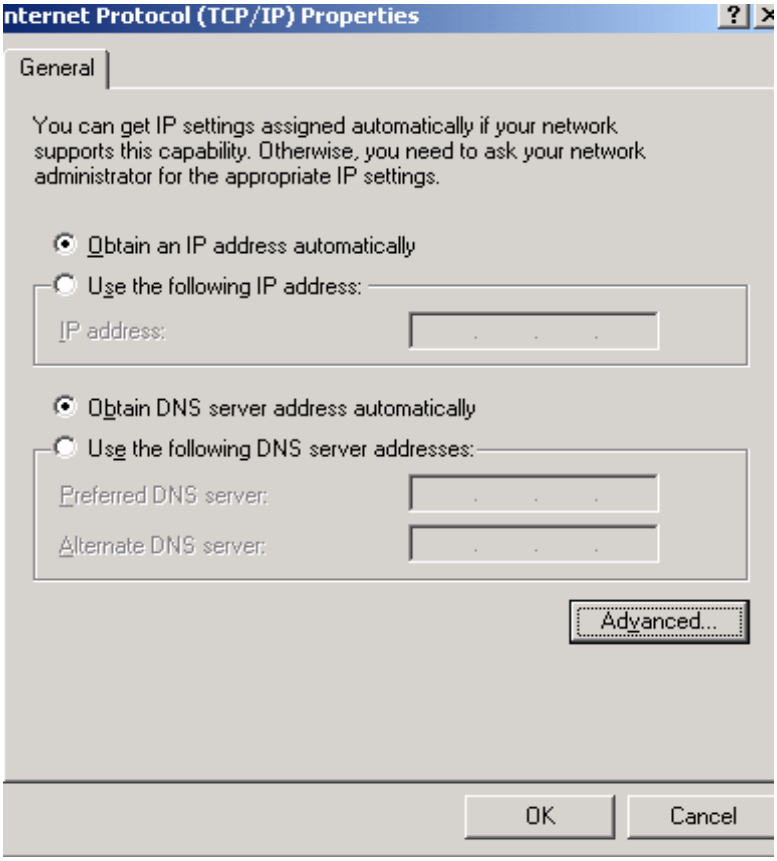


Ensure non of the PPP options are selected.

Select ->OK.

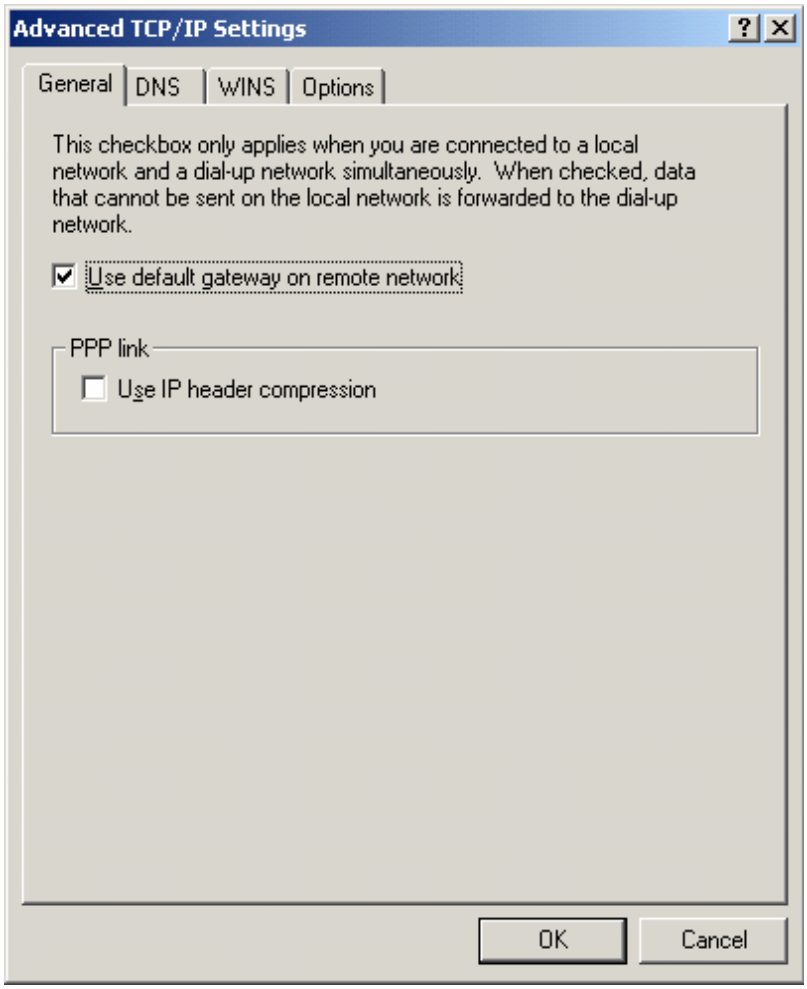
On the main window ensure that the Internet Protocol (TCP/IP) option is selected.

Select->Properties.



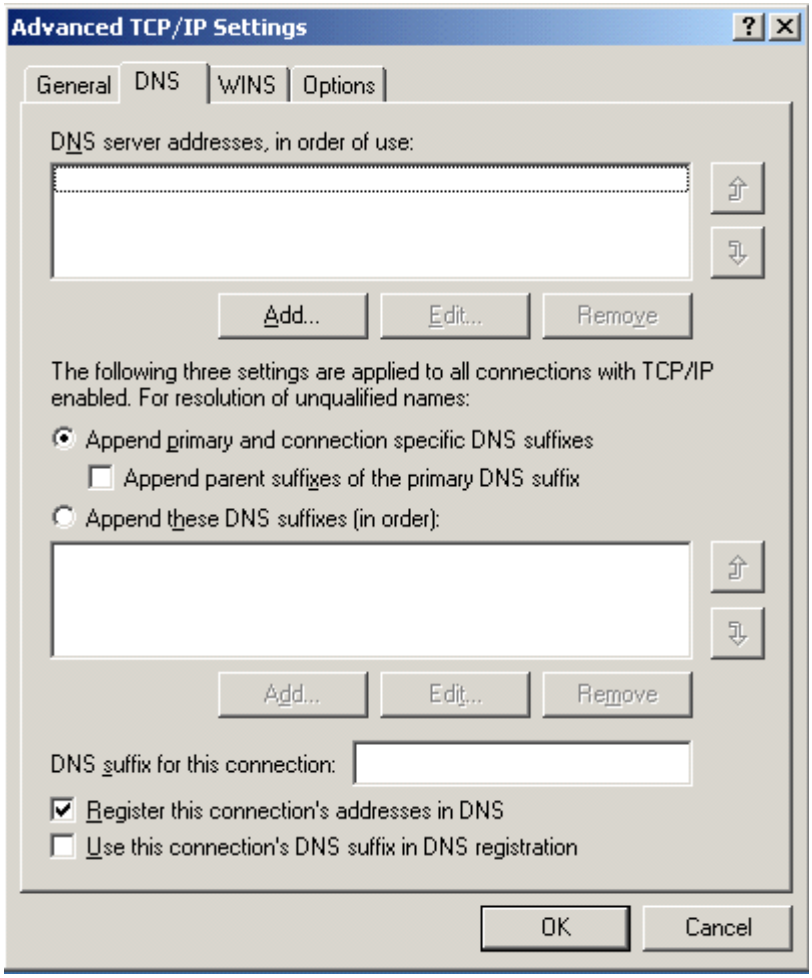
Ensure the above options are selected.

Select ->Advanced



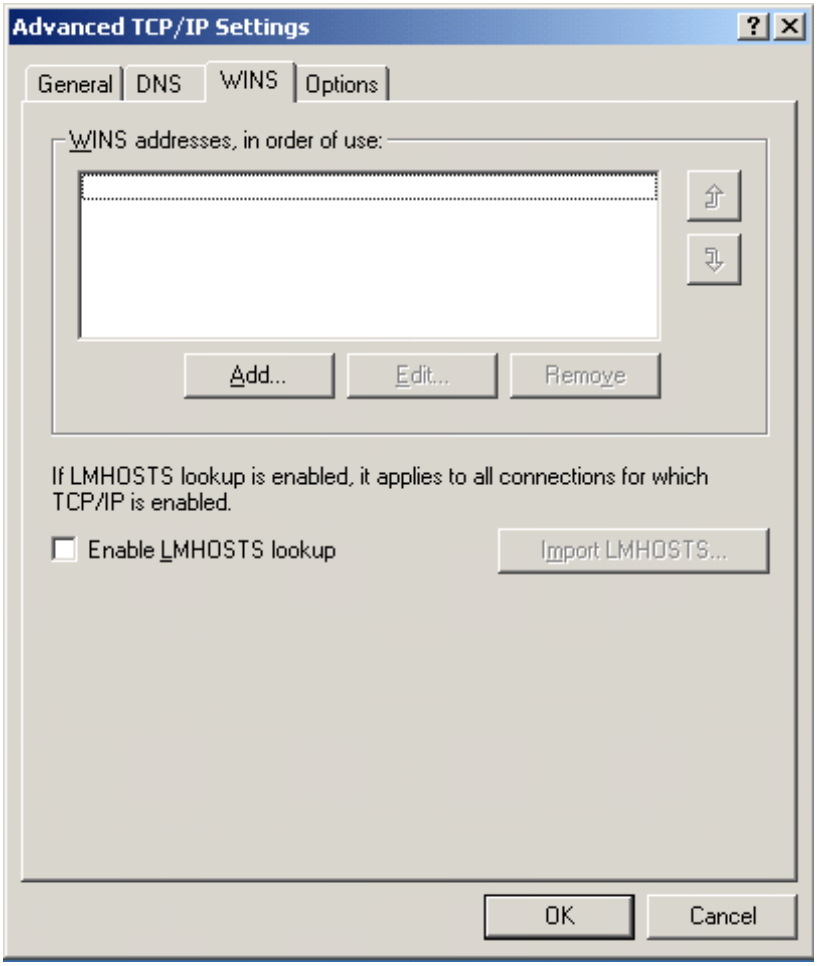
Select ->Use Default Gateway on Remote Network.

Select ->DNS



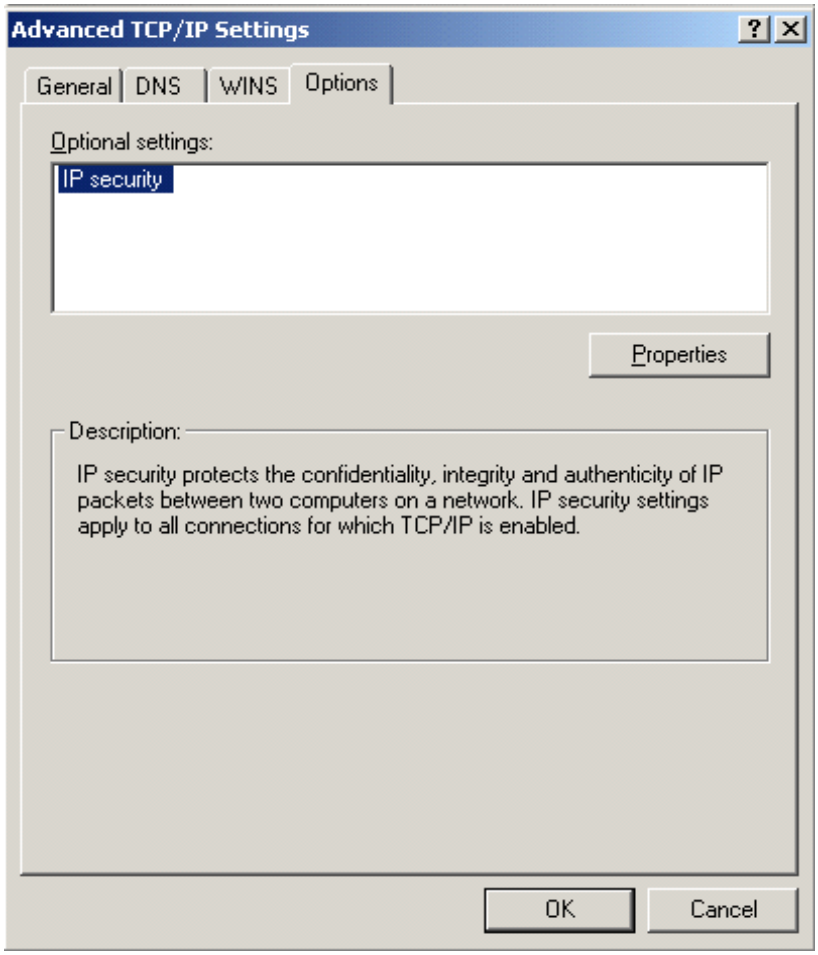
Ensure the above options are selected.

Select ->WINS

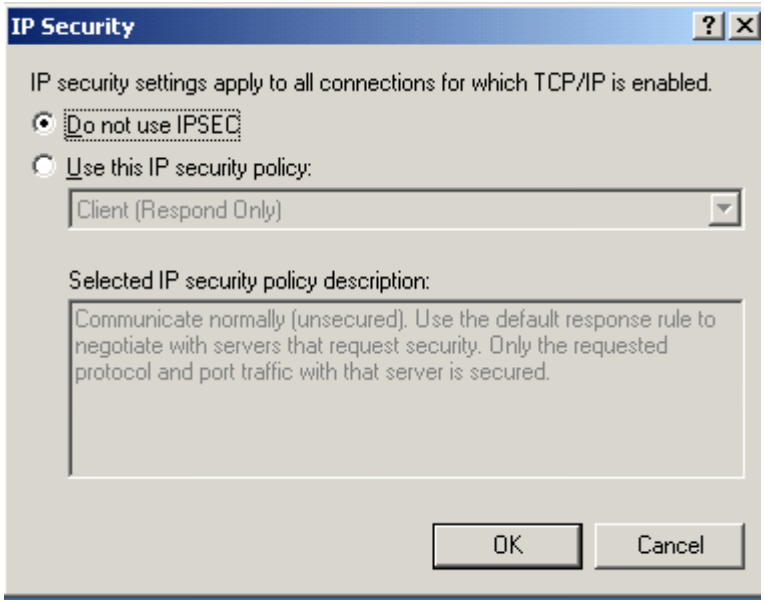


Ensure nothing is selected in this window.

Select ->Options.



Select ->Properties.



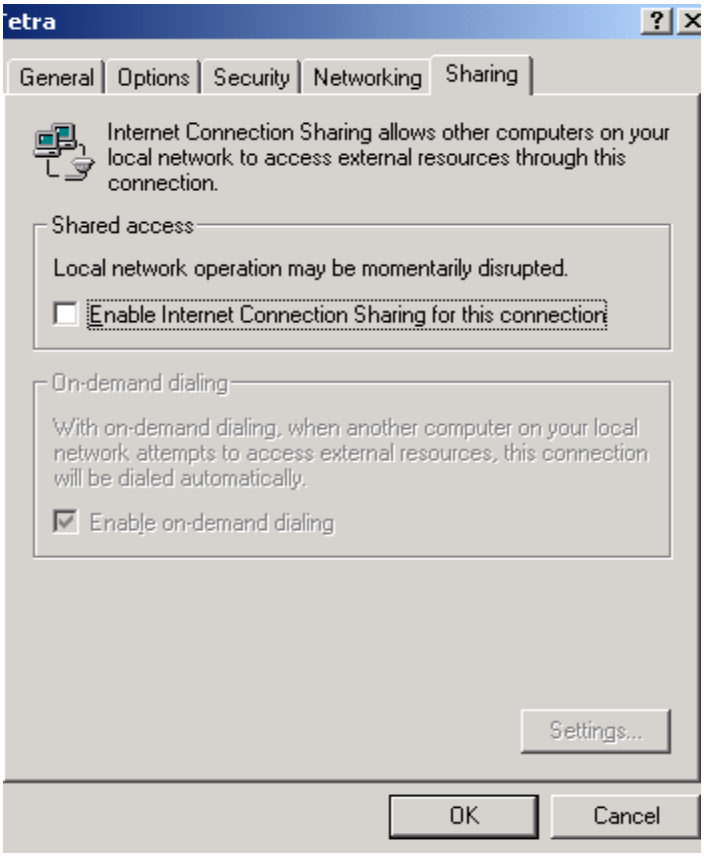
Ensure the above option is selected.

Select ->OK

Select ->OK.

Select ->OK

At the main window select ->Sharing.



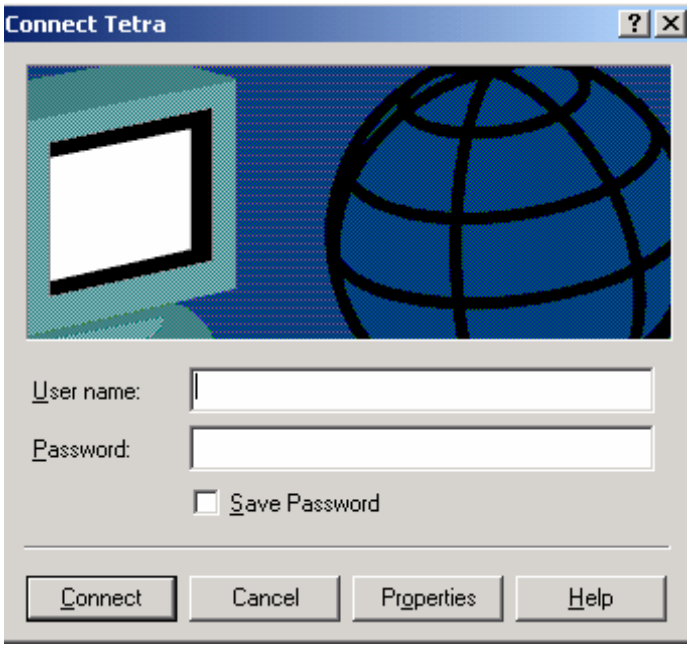
Ensure either othing is selected or is ‘Greyed’ out in this window.

Select ->OK

Close the application if it is not going to be used.

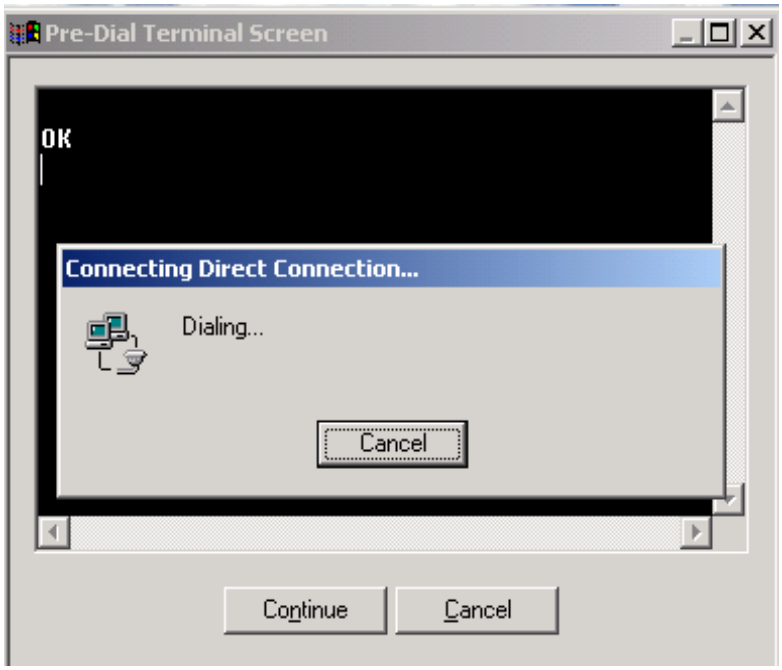
4.2 Registering on the System for Packet Data

If the application is not running, select the desk top icon.



Select ->Connect

This will open the ‘Pre-Dial Terminal screen.

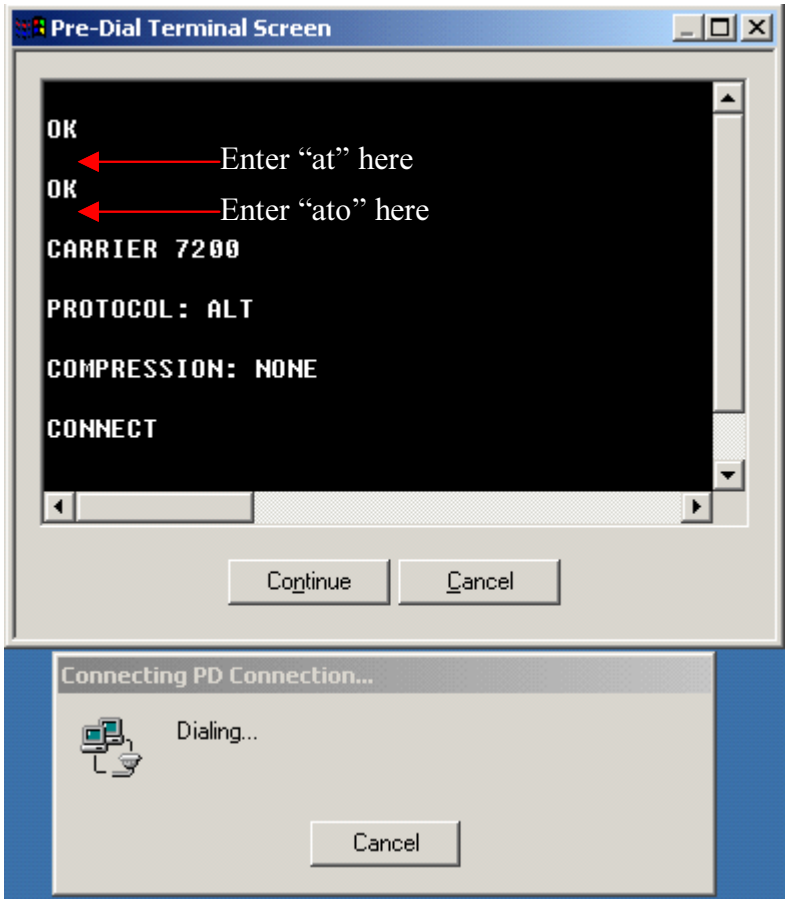


Enter the following AT commands:

At the prompt type <at><select the enter key>

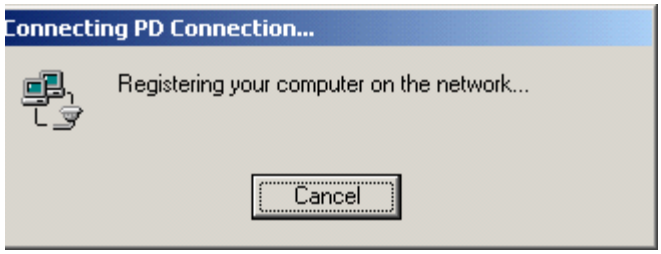
At the prompt type<ato><select the enter key>

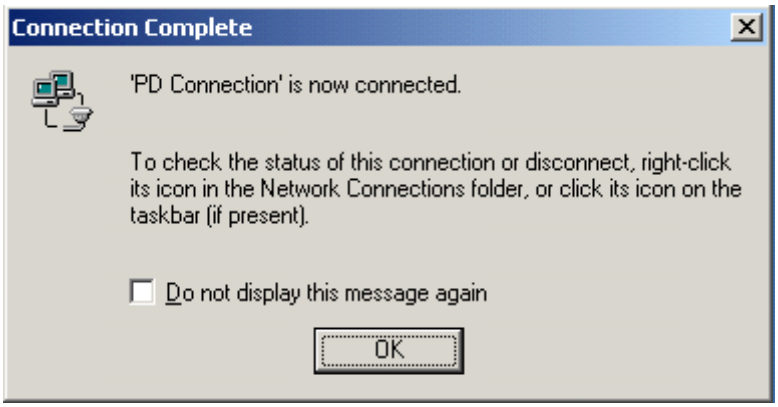
The screen will now display the following:



Select ->Continue.

The following message sequencies should now be displayed:





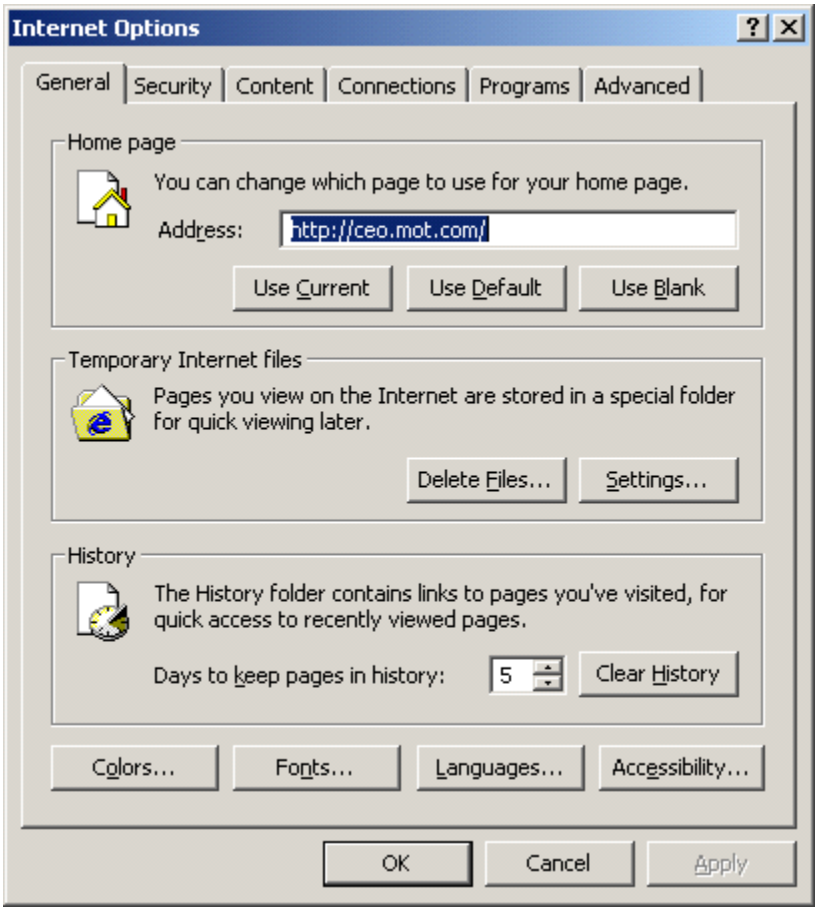
The Terminal/Computer combination is now working on the system and packet data can now be transmitted and received.

4.2.1 FTP Server

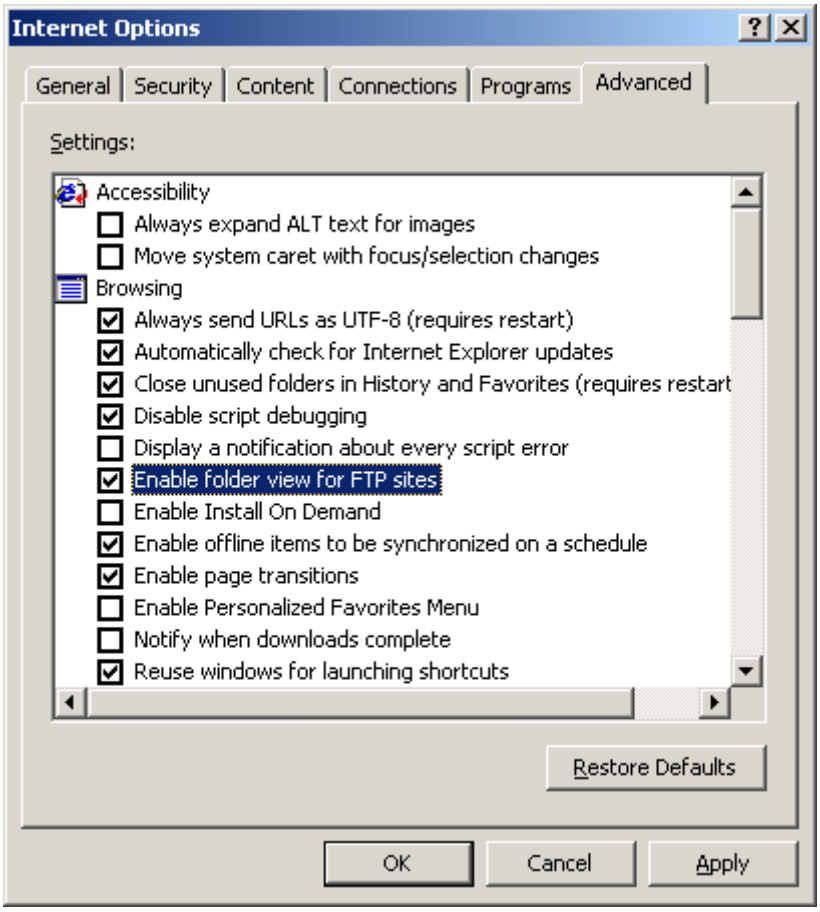
Due to issues with running FTP from Windows®, it is recommended to use the Internet Explorer® FTP option when transferring files greater than 10K.

Open Internet Explorer.

Select ->Tools ->Internet Options.



Select ->Advanced

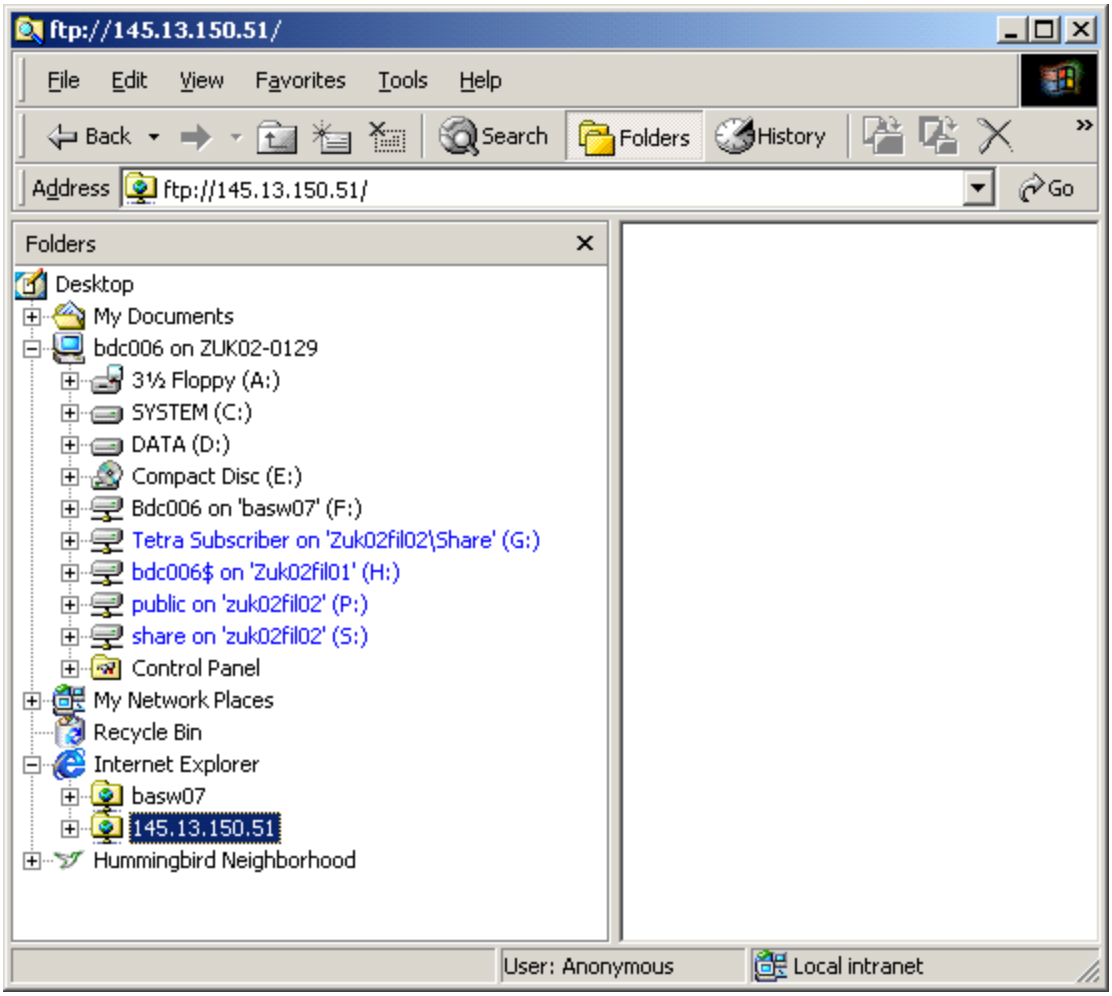


Ensure the ‘Enable Foplder View for FTP sites’ is selected.

Select ->OK

Close Internet Explorer.

Open Windows Explorer.



In the ‘Address’ box, type in the following: e.g.

ftp://145.13.150.51/

Change the IP address 145.13.150.51 to that of the terminal connected to the computer.

An folder icon will be created as shown above and you will now be logged in as an ‘anonymous’ user.

Files can now be transferred.

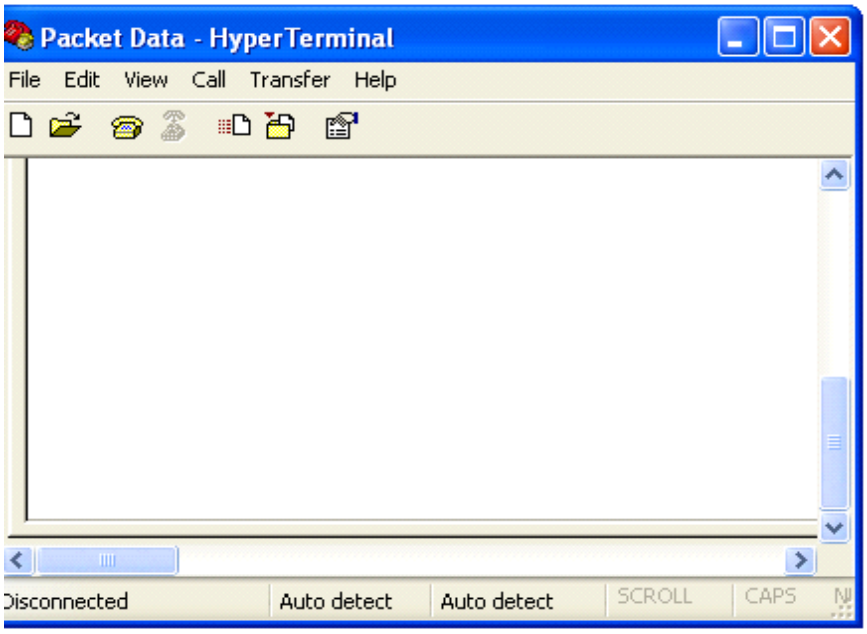
5 Hyper Terminal

It is also possible to use the ‘Hyper Terminal’ feature of the computer.

To run Hyper Terminal once the terminal and computer have been connected, at the computer select

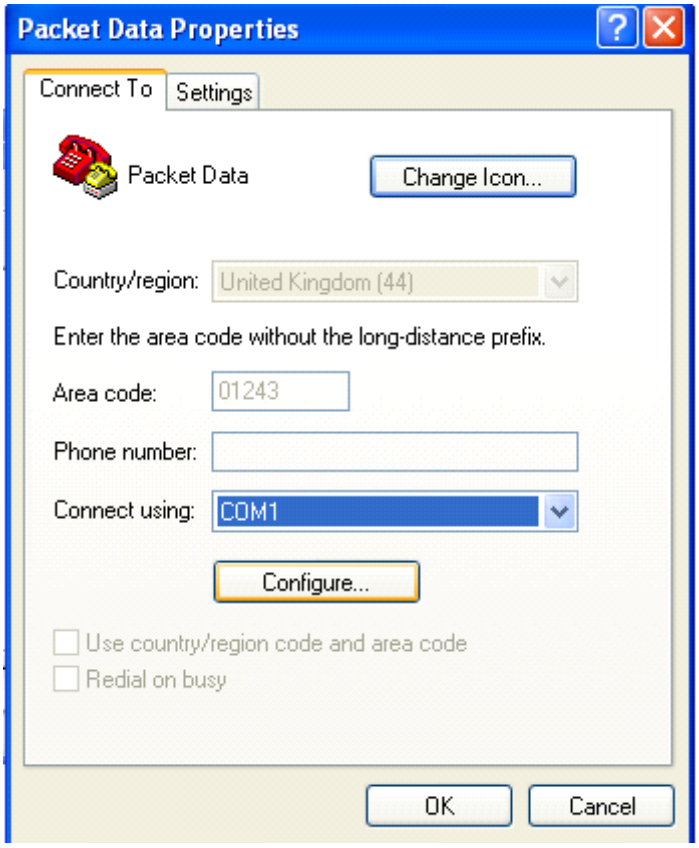
the following path to open the application:

Start ->Programs ->Accessories ->Communications ->Hyper Terminal.



Select:- File ->Properties

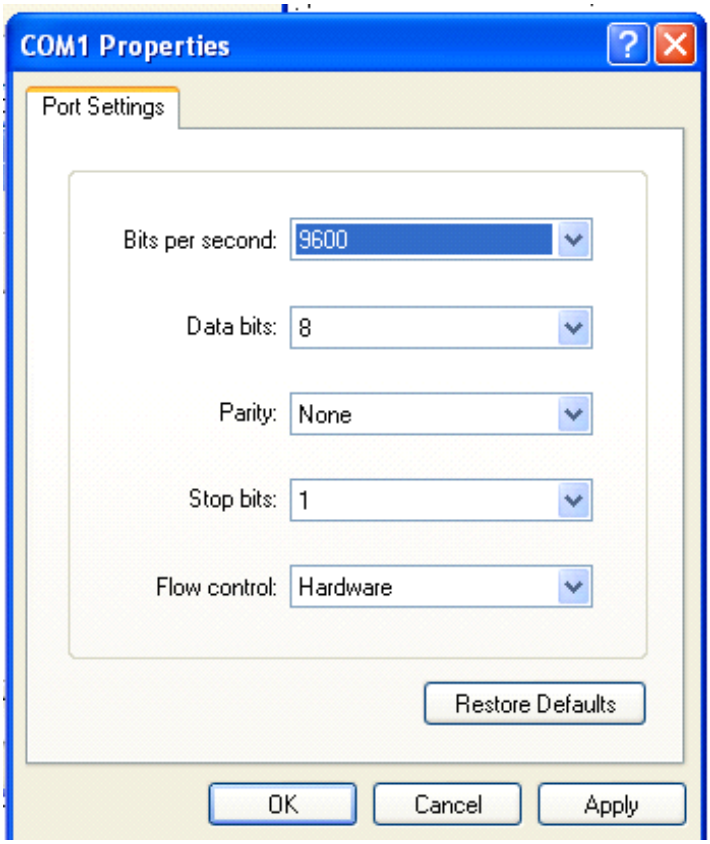
This will display the Packet Data Properties screen.



Uncheck any ‘Ticked’ boxes.

Select the required Com port, i.e. Com 1.

Select ‘Configure’ to display the Com1 Properties screen.



Configure the properties with the above settings.

It is now possible to use AT commands via the Hyper Terminal.

6 AT Commands

The AT Commands supported by the terminal is a subset of the available AT Commands.

Note:

1. Each response from the terminal is followed by a <CR><LF><OK><CR><LF>
2. Each DTE command is terminated with a <CR>

The Motorola Proprietary format for SDS is selected in CPS.

6.1 Examples of DTE Commands to the Terminal

Table 4-1

DTE Command	Possible Terminal Responses
AT+CTOM=<AI mode>	+CTOM:_<AI mode>
AT+CTOM?	+CTOM:_<AI mode>
AT+CTOM=?	+CTOM:_(0,1)
AT+CTGS=1,<selected GSSI>	+CTGS:_<group type>, <selected GSSI>
AT+CTGS?	+CTGS:_<group type>, <selected GSSI>
AT+CTGS=?	+CTGS:_(1,2),(0-16777215)
AT+CTDGR=<GR unsolic>	OK
AT+CTDGR?	+CTDGR:_[<DM communication type>, <address>,<MNI>,<presence information> <CR><LF> [,_<DM communication type>, <address>,<MNI>,<presence information>]]
AT+CMGS=<da>,1,0,<length>	+CMGS:_0
AT+CMGS=?	
AT+CMGS=[<da>],[<toa>],[<area>],<length>[,<data-type>] [,<mcc>,<mnc>]<CR> <data><ctrl>-Z/ESC>	+CME_ERROR:_<err>
All other	+CME_ERROR:_<err>

6.2 Examples of Terminal to DTE Unsolicited Messages

Table 4-2

Terminal	DTE
+CTOM:_<AI mode>	
+CTGS:_<group type>,<selected GSSI>	
+CTDGR:_[<DM communication type>, <address>,<MNI>,<presence information> <CR><LF> [,_<DM communication type>, <address>,<MNI>,<presence information>]]	
+CMT:_<oa>,<tooa>,<length><CR><LF><data>	