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MTP850 Ex/MTP810 Ex TETRA Handportable Terminal Product Information Manual

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Chapter 1

PRODUCT OVERVIEW

1 Introduction

This Product Information Manual is a reference manual that explains all the features, functionality of the MTP850 Ex/MTP810 Ex TETRA Handportable Terminals and the Customer Programming Software (CPS) used for programming the terminal.

The Product Information Manual describes the following:

- Available features
- User interface
- Available accessories
- Product ordering details
- Features designed for a special business needs/requirements
- The Customer Programming Software (CPS)
- PC to terminal connection 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 How to Use This Product Information Manual

The Product Information Manual is divided into four chapters -

- Chapter 1** This chapter is an overview 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 and software.
- Chapter 2** This chapter is generic and not only describes the Features and Benefits of the products but also explains how some of these features can be used for the benefit of customers.
- Chapter 3** This chapter describes the 'Customer Programming Software' (CPS). It explains the available feature options, the settings' range and defaults where applicable.
- Chapter 4** This chapter describes the method for connecting a computer to a Motorola TETRA terminal for data applications.

2 The MTP850 Ex/MTP810 Ex TETRA Terminal

The introduction of the MTP850 Ex/MTP810 Ex has been developed to meet the demands of:

- Existing customers
- New users to the Operational Market who require a more ergonomically friendly product
- Benefits of an intrinsically safe radio
- To support these new features and future enhancements, the terminal uses the latest chip set technology

The MTP850 Ex/MTP810 Ex has been developed as a rugged tool for use anywhere where there is the likelihood of explosive gases and/or explosive dusts such as in the following market segments:

- Public Safety, Fire Brigades
- Oil and Gas, Refineries, Oil rigs, Pipeline industry, Petrochemical industry, Fuel distribution
- Industrial, Pharmaceutical industry, Chemical industry, Food industry
- Military, Coast Guards
- Marine

2.1 Terminal Software Upgrades

Motorola realises that as customer communication requirements evolve, it is necessary to be able to offer solutions, to meet these changing requirements, that do not force customers to replace existing terminals.

As with the previous generations of Motorola TETRA terminals, the MTP850 Ex/MTP810 Ex will have common software features and use a common CPS. Terminal software upgrades will be available on all future releases of CPS and will allow new functionality to be added quickly and easily to the Terminal Products.

Benefits

- Customers can upgrade their stock quickly and efficiently.
- End users benefit from new functionality without the cost and inconvenience of buying new terminals.
- This provides the ability to offer a changing range of terminal feature benefits to meet the evolving needs of customers.

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 & ETS 300-019-1-7

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

2.2.4 European Specifications

The terminals also meet the following European Specifications.

<u>Specification</u>	<u>Type</u>
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 MTP850 Ex/MTP810 Ex User Interface



Figure 1-1 MTP850 Ex/MTP810 Ex Portable Terminals Controls and Indicators




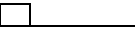
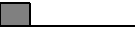

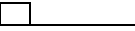



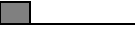







Item	Description
1	Antenna
2	LED (Indicator)
3	Top Microphone Activated during half-duplex, high-audio calls such as Group Calls.
4	Side Connector Used to connect accessories and for programming.
5	Colour Display Provides alphanumeric text and images within 65,536 colours and 130 x 130 pixels with backlight, scalable fonts, and contrast.
6	Soft Key(s) Press to select the option that appears in the display directly above the left or right soft key.


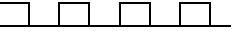





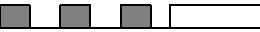
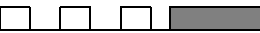








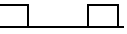

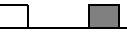

Item	Description
7	Menu Key Used to enter the main menu and the context sensitive menu.
8	On-Off/End/Home Key Press and hold to turn the MTP850 Ex/MTP810 Ex On/Off. Press to end calls. Press to return to the Home display (idle screen).
9	Speaker (under the front panel)
10	Speaker Control Key Selects earpiece (low audio) or speaker (high audio).
11	Bottom Microphone Activated during half-duplex and full-duplex, low-audio calls such as Phone Calls.
12	Send Key Used to initiate or answer full-duplex calls (such as Phone Calls), or send status and text messages.
13	Four-Way Navigation Key Press up, down, left or right for list scrolling, while moving around the menu hierarchy.
14	Programmable Side Keys 1 and 2 Default programming: upper Side key activates/deactivates Backlight; lower Side key activates Screen Saver.
15	Push-To-Talk Button (PTT) Press and hold this side button to talk in half-duplex calls, release it to listen. Press to send status and text messages.
16	Earpiece
17	Programmable Rotary Knob Default programming: "Dual" - Press the knob to toggle between "volume" and "list". Side keys (No. 17) operate as programmed.
18	Emergency Button (on top of the terminal) Press and hold to enter Emergency Mode, and send Emergency Alarms (as programmed). When the MTP850 Ex/MTP810 Ex is Off, press and hold to power on in Emergency Mode or in normal mode (as programmed).

3.1 MTP850 Ex/MTP810 Ex LED Indications

LED Indications	Terminal Status
Solid Green	In Use
Flashing Green	In Service
Solid Red	Out of Service
Flashing Red	Connecting to Network / Entering DMO
Solid Orange	Transmit Inhibit (TXI) Enabled / Channel Busy in DMO
Flashing Orange	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 MTP850 Ex/MTP810 Ex 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)
Talk permit without gateway sounds upon pressing PTT. The tone indicates the gateway is no longer available.		Once
Talk prohibit System busy Time-out timer expire Called MTP850 Ex/MTP810 Ex 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





☐ = High Tone; ■ = Low Tone		
Description	Type	Repeated
Your MTP850 Ex/MTP810 Ex 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
Man Down feature is on		Once
Man Down feature is off		Once or Repeated
Man Down pre-alert		Once or Repeated
Man Down device failure		Until you disable the feature.

3.3 MTP850 Ex/MTP810 Ex Display Icons









3.3.1 Status Icons

These appear either when the phone is engaged in certain activities, or when certain features have been activated.





Status Icon	Description
Trunked Mode Operation (TMO)	
	Signal Strength Allows you to check signal strength. More bars indicate a stronger signal.
	No Service
	Scan Indicates scanning is activated in the MTP850 Ex/MTP810 Ex.
	Data Connected Displayed when the MTP850 Ex/MTP810 Ex is successfully connected to an external device and ready for data transfer.
	Data Transmit/Receive Displayed when the MTP850 Ex/MTP810 Ex 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 (DMO)	
	Signal Strength Indicates an incoming Direct Mode Group Call.
	Direct Mode Displayed when the MTP850 Ex/MTP810 Ex is in Direct Mode.
	DMO Gateway Indicates that gateway is selected. The icon has three states: Solid — while the MTP850 Ex/MTP810 Ex is synchronised with the gateway. Flashing — while the MTP850 Ex/MTP810 Ex is not synchronised or during attachment. No icon — during a terminal to terminal and repeater call.
	DMO Repeater Displayed when the repeater option in DMO is selected. This icon has three states: Solid — while the terminal has detected the repeater (that is, 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 MTP850 Ex/MTP810 Ex.
	Speaker Off (Low Audio) Indicates that the audio will sound through the earpiece. (See detailed explanation of Speaker Control key.)
	Battery Strength Shows the charge in your battery. Full icon is full charge.
	Emergency Appears while the MTP850 Ex/MTP810 Ex is in Emergency Mode.
	List Scrolling Displayed to indicate that the Rotary knob use is list scrolling, as long as this use is selected.
	New Message Has Arrived Indicates a new message just arrived.

Status Icon	Description
	New Message(s) in Inbox Indicates that you have unread messages in your inbox.
	Man Down Active (Blue) Indicates that the Man Down feature is active.
	Man Down Alert (Red) Displayed when the Man Down feature is active. This icon has two states: Blinking – pre-Alert; the terminal signalizes Man Down conditions. To exit the pre-Alert state, change the conditions or press the PTT button. Solid – the terminal entered the Alert mode.
	Man Down Failure Indicates the Man Down device failed.








3.3.2 Menu Icons

Menu Icon	Description
	Main Menu Items/Context Sensitive Menu Appears above  if the main menu items/context sensitive menu are active.
	Messages <ul style="list-style-type: none"> • Send status messages, • Send short text messages (according to user defined or predefined templates), • Receive messages in inbox.
	Contacts Add, search, or erase entries in the contact list.
	Security Lets you turn On/Off and verify security features.
	Setup Allows you to customise your MTP850 Ex/MTP810 Ex.
	More... Contains more customisable menu items.
	Scroll Bar Indicates navigation among items that occupy more than one screen. If all items appear in one screen, the scroll bar is empty.

3.3.3 Inbox Icons

Inbox Icon	Description
	Unread (New) Message Indicates that you have not read the message yet.
	Read (Old) Message Indicates that you have read the message.
	Sender Information in Message View Indicates sender information (name or number).
	Time and Date Stamp in Message View Indicates the time and date of message arrival.

3.3.4 Contact Icons

Contact Icon	Description
	Private ID Number
	Mobile Phone Number
	Home Phone Number
	Work Phone Number
	PABX Number
	Other Phone Number
	Pickers Indicate more than one number is stored with the contact.

3.4 MTP850 Ex/MTP810 Ex Languages Supported

The following languages are supported by the radio:

- English
- German
- French
- Spanish
- Dutch
- Greek
- Italian
- Swedish
- Norwegian
- Lithuanian
- Hungarian
- Arabic
- Russian
- Chinese (simplified)
- Chinese (traditional)
- Korean

- User Defined Language

4 MTP850 Ex/MTP810 Ex Technical Specifications

4.1 General Specifications

Title	Specifications
Dimensions HxWxD mm	135 x 55 x 38
Weight g	400 (including battery and antenna)
Battery Operating Life 05/05/90 duty cycle	725 mAh, 7.2 V 12 hours
Colour Display	130 x 130 pixel screen size with 65,536 vivid colours flip screen and large text options
Talk Groups - TMO	2048 Entries
Talk Groups - DMO	1024 Entries
My Favorite Groups	128 Entries
Contact List	1000 Persons up to 6 numbers per entry Max. 2000 entries
Text Message List - incoming	20 Entries
Text Message List - outgoing	max. 100 Entries depending on mail's length
Status List	100 Entries
Country Code/Network Code List	100 Entries
Scan List	40 Lists of 20 Groups
TMO Services	Group Call Private Call Telephony DGNA Late entry Half / Full Duplex Full Duplex up to 2047 groups
DMO Services	Group Call Private Call Compatibility Late entry Gateway and Repeater
Operating Temperature °C	-20 to +50 (Hazardous Environments) -20 to +60 (Non-Hazardous Environments)
Storage Temperature °C	-40 to +85
Humidity	ETSI 300 019-1-7 Class 7.1, 7.2 and 7.3
Dust and Water	IP64 (Cat. 2)
Shock (Mechanical), Drop & Vibration	ETSI 300 019-1-7 Class 7.1, 7.2 and 7.3

4.2 ATEX Specifications

The terminals have the following ATEX ratings:

Terminal	Rating	Specifications
MTP850 Ex - 2D	ATEX	<ul style="list-style-type: none"> Gas: II 2G Ex ib IIC T4 Category 2, Approved for Zone 1, Equipment group II, Gas group C, Temperature class T4, T_{amb} -20° C to +50° C Dust: II 2D Ex ibD 21 IP6x T90° C Category 2, Approved for Zone 21, 22, Equipment group II
MTP850 Ex - 3D	ATEX	<ul style="list-style-type: none"> Gas: II 2G Ex ib IIC T4 Category 2, Approved for Zone 1, Equipment group II, Gas group C, Temperature class T4, T_{amb} -20° C to +50° C Dust: II 3D Ex ibD 22 IP5x T90° C Category 3, Approved for Zone 22, Equipment group II
MTP810 Ex	ATEX	<ul style="list-style-type: none"> Gas: II 2G Ex ib IIA T3 Category 2, Approved for Zone 1, Equipment group II, Gas group A, Temperature class T3, T_{amb} -20° C to +50° C Dust: II 3D Ex ibD 22 IP5x T90° C Category 3, Approved for Zone 22, Equipment group II

4.3 RF Specifications

Title	Specifications
Frequency Bands MHz	380 - 430 MHz
RF Channel Bandwidth kHz	25
Switching Bandwidth TMO MHz	50
Switching Bandwidth DMO MHz	50
RF Power Control	3 steps of 5 dB
Transmitter RF Output Power W	1
RF Power Level Accuracy +/- dB	2
Receiver Class	A and B
Receiver Static Sensitivity dBm	-112 minimum (-115 typical)
Receiver Dynamic Sensitivity dBm	-103 minimum (-107 typical)

4.4 GPS Specifications

Title	Specification
Simultaneous Satellites	12
Mode of Operation	Autonomous or Assisted (A-GPS)

Title	Specification
GPS Antenna	Integrated in TETRA antenna
Sensitivity	-152 dBm / -182 dbW
Accuracy	5 meters - 50% probable
Location Protocols	ETSI LIP Motorola LRRP

The information contained on these pages may be subject to change without further notice.

All product features are subject to infrastructure support.

Selected features are subject to optional software upgrade.

5 Ordering the MTP850 Ex/MTP810 Ex & Accessories

General Information

TETRA Subscribers are only available to Accredited Channel Partners who will be advised of the discount structure that will be applied to these products.

Ordering Requirements

1. Order the main model
2. Order one option from each of the following categories. All 4 categories are mandatory:
 - | Order either clear or encryption software option (one and only one selection per model) (see notes on languages below)
 - | Order antenna option (one and only one selection per model)
 - | Order battery option (one and only one selection per model)
 - | Order charger option (one and only one selection per model)

IMPORTANT: Export controls apply when ordering encryption.

3. The following steps are not mandatory.
 - | Order software features as required. MSPD, GPS and WAP are available as **Software Enablement Kits**.
 - | Order Tamper Evident Label if required.
 - | Add additional hardware accessories as needed.

Note on Software Features GPS, WAP, MSPD and Man Down

- The main model provides a Global Positioning System **GPS** hardware equipped terminal. Customers can enable the GPS by ordering the relevant software feature, see "Ordering the Software Enablement Kits" on page 1-19.
- The terminal is capable of interfacing with a Wireless Application Protocol **WAP** server. Customers can enable the WAP software by ordering the relevant software feature.
- Packet Data (PD) service is a bearer service that allows two parties in a TETRA system to communicate using the IP protocol. PD is transferred over the air interface using a packet data channel (PDCH).
Multi Slot Packet Data **MSPD** allows full usage of a multislot PDCH, which means up to 4 slots can be used for Packet Data transfers depending on available infrastructure resources. Multislot PD is therefore 2 to 4 times faster than Single Slot PD. The MSPD feature can operate with Air Interface Encryption.
- The main model provides a Man Down appliance equipped terminal. Customers can enable the Man Down feature by ordering the relevant software kit, see "Ordering the Software Enablement Kits" on page 1-19.

The software features can be ordered independently of ordering a MTP850 Ex/MTP810 Ex terminal, see "Ordering the Software Enablement Kits" on page 1-19.

For each order a dongle will be provided with the purchased number of enablers.

Models

Description	Model Number
MTP850 380-430M LKP ATEX PT911BHEX	H01PCF6TZ5 N

Options

Software Release

Description	Option Number
ADD: MR8.6 SOFTWARE	QA00926AA

Arabic Software

Description	Option Number
ADD:MTP850EX 380 CLEAR ARB	QA00855AA
ADD:MTP850EX 380 TEA1 ARB	QA00861AA
ADD:MTP850EX 380 TEA3 ARB	QA00868AA

Cyrillic Software

Description	Option Number
ADD:MTP850EX 380 CLEAR CYR	QA00892AA
ADD:MTP850EX 380 TEA1 CYR	QA00862AA
ADD:MTP850EX 380 TEA3 CYR	QA00869AA

Roman Software

Description	Option Number
ADD:MTP850EX 380 CLEAR ENG	QA00851AA
ADD:MTP850EX 380 TEA1 ENG	QA00857AA
ADD:MTP850EX 380 TEA2 ENG	QA00863AA
ADD:MTP850EX 380 TEA3 ENG	QA00864AA

Antennas

Description	Option Number
ADD: WHIP (LONG LENGTH) 380-520 MHz WITH GPS	QA00916AA
ADD: STUBBY(MEDIUM LENGTH) 380-435 MHz WITH GPS	QA00915AA

Description	Option Number
ADD: STUBBY (SHORT LENGTH) 380-435 MHz WITH GPS	QA00914AA

Batteries

Description	Option Number
ADD: ATEX LI-ION BATTERY	QA00917AA
ADD: TWO ATEX LI-ION BATTERIES	QA00918AA

Battery Chargers

Description	Option Number
ADD: IMPRES SINGLE UNIT CHARGER W/UK PLUG	QA00920AA
ADD: IMPRES SINGLE UNIT CHARGER W/EURO PLUG	QA00921AA
DEL: CHARGER	QA00925AA

Remote Speaker Microphone

Description	Option Number
ADD: ATEX REMOTE SPEAKER MICROPHONE	QA00936AA
DEL: ATEX REMOTE SPEAKER MICROPHONE	QA00937AA

Carry Cases

Description	Option Number
ADD: ATEX BELT CLIP 2.5 INCH	QA00165AA
DEL: ATEX BELT CLIP 2.5 INCH	QA00166AA

Publications

Description	Option Number
ADD: BASIC USER GUIDE (EN/DE/FR/NL/ES)	QA00927AA
ADD: BASIC UG (EN/SV/NO/IT/PT)	QA00928AA
ADD: BASIC UG (EN/GR/AR/PL/RU)	QA00929AA
ADD: BASIC UG (EN/HU/LT)	QA00930AA

EN = English, DE= German, FR = French, NL = Dutch, ES = Spanish, SW = Swedish,
 NO = Norwegian, IT = Italian, PT = Portuguese, GR = Greek, AR = Arabic, PL = Polish,
 RU = Russian, CHINESE SIMPL = Chinese simplified, CHINESE TRAD = Chinese traditional

Accessories

Antennas

Description	Frequency Range	Nomenclature
WHIP ANTENNA WITH INTEGRATED GPS	380–430MHz	85007013001
STUBBY ANTENNA WITH INTEGRATED GPS	380–435MHz	8587526V14
HELICAL STUBBY ANTENNA WITH INTEGRATED GPS	380–430MHz	85007012001

Batteries

Description	Nomenclature
ATEX LI-ION BATTERY	NNTN7383

Battery Chargers

Description	Nomenclature
IMPRES™ SINGLE UNIT CHARGER (UK PLUG)	WPLN4183
IMPRES™ SINGLE UNIT CHARGER (EURO PLUG)	WPLN4184
IMPRES™ SINGLE UNIT CHARGER (SWITCH MODE POWER SUPPLY UK PLUG)	PMLN5194
IMPRES™ SINGLE UNIT CHARGER (SWITCH MODE POWER SUPPLY EURO PLUG)	PMLN5188
IMPRES™ MULTI UNIT CHARGER WITHOUT DISPLAY (UK PLUG)	WPLN4188A
IMPRES™ MULTI UNIT CHARGER WITHOUT DISPLAY (EURO PLUG)	WPLN4189A
IMPRES™ MULTI UNIT CHARGER WITHOUT DISPLAY (HYBRID PLUG)	WPLN4205
IMPRES™ MULTI UNIT CHARGER WITH DISPLAY (UK PLUG)	WPLN4193A
IMPRES™ MULTI UNIT CHARGER WITH DISPLAY (EURO PLUG)	WPLN4194A
IMPRES™ MULTI UNIT CHARGER WITH DISPLAY (HYBRID PLUG)	WPLN4204

Carrying Devices

Description	Nomenclature
SHOULDER WEARING DEVICE	PMLN5004
CARRY CASE SHOULDER STRAP	NTN5243A
ATEX BELT CLIP 2.5 INCH	PMLN5134
HARD LEATHER CASE FOR BARTEX, BLACK	PMLN5287
SOFT LEATHER CASE FOR BARTEX, BLACK	PMLN5288

Programming/Data Cables

Description	Nomenclature
TETRA ATEX SERIAL CABLE	PMLN5237
TETRA ATEX USB CABLE	PMLN5235

Audio Accessories

Description	Nomenclature
ATEX OVER THE HEAD HEAVY DUTY HEADSET	PMLN5389
ATEX BEHIND THE HEAD HEAVY DUTY HEADSET	PMLN5390
ATEX OVER THE HEAD LIGHTWEIGHT HEADSET	PMLN5391
ATEX BEHIND THE HEAD LIGHTWEIGHT HEADSET	PMLN5392
ATEX THROAT MICROPHONE WITH REMOTE PTT (80 MM)	PMMN4063
ATEX SKULL MICROPHONE WITH REMOTE PTT (80 MM)	PMMN4064
ATEX REMOTE SPEAKER MICROPHONE WITH VOLUME CONTROL	PMMN4058

Programming Software

Description	Part Number
MR8.6 CUSTOMER PROGRAMMING SOFTWARE	PMVN4150A

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.

These kits are applicable to MTP850 Ex/MTP810 Ex terminals.

Software Selling - Tools and Mechanisms

For MR8.6 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 (for example WAP 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 (6802974C10_) on the CPS CD for more information on how to implement the supplied software.

Ordering Requirements

How to Place an Order for a Software Enablement Kit

1. Order the Main Kit GM0194
2. Select the software feature option from the following. You can select more than 1 feature for each Main Kit:
 - QA00993 - Option to enable Man Down feature. Order quantity equaling number of models requiring Man Down enablement.
 - QA00175 - Option to enable WAP feature. Order quantity equaling number of models requiring WAP enablement.
 - QA00176 - Option to enable Multi Socket Packet Data (MSPD) feature. Order quantity equaling number of models requiring GPS enablement.
 - QA00177 - Option to enable GPS feature. Order quantity equaling number of models requiring GPS enablement.
 - QA00771 - Option to enable Enhanced Security feature. Order quantity equaling number of models requiring Enhanced Security enablement.
 - QA00772 - Option to enable Permanent Disable feature. Order quantity equaling number of models requiring Permanent Disable enablement.

Example Order

The following order is required:

- 20 radios
- 10 GPS software enables
- 10 MSPD software enables
- 20 WAP 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 GM0194)
- 10 GPS (10 x QA00177)
- 10 MSPD (10 x QA00176)
- 20 WAP (20 x QA00175)

Note: The CPS will not allow additional radios to be enabled with Man Down, WAP, GPS, MSPD, Enhanced Security nor Permanent Disable (unless further Software options are ordered).

Chapter 2

SERVICES AND FEATURE DESCRIPTION

1 Introduction

This chapter specifies the agreed services and functionality of the Motorola MTP850 Ex/MTP810 Ex terminals release MR8.6.

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 MTP850 Ex/MTP810 Ex terminals for MR8.6, 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 10] through [Ref 16].

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 Mic)
- Half-duplex private call
- Full duplex private call
- Telephone call (PSTN /PABX)
- SwMI Authentication of terminal, and made mutual by terminal
- 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)
- Multi-Network Operation (Selected network only)
- Packet Data (Multi Slot)
- Transmit Inhibit (RF Sensitive Area Mode)
- Ambience Listening - see Paragraph 15.1.6 "Ambience Listening (AL)".
- BUP & RL
- Pre-emptive Priority Call - see Paragraph 15.2 "Pre-emptive Priority Call (PPC)".

- Dynamic Key Encryption - see Paragraph 12.3.3 "Derived Cipher Key Encryption and Group Cipher Keys GCK (Class 3)".
- Broadcast Call - see Paragraph 2.1.17 "Broadcast Call".
- TNP1

1.1.2 Direct Mode Operation (DMO)

- DMO Group Call
- DMO Private Call
- DMO 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-MNI (including open group and open MNI)

Also covered by this document are mobility, security, group management and MMI services which support and enhance the above user services.

1.1.3 MTP850 Ex/MTP810 Ex Platform Features

- Man Down (see Paragraph 17 "Man Down Feature")
- Built-in GPS receiver
- Flashing via USB
- High resolution colour display
- 4-way navigation key
- Dual-function rotary (Volume, list selection) with push button
- Energy Economy

1.1.4 General Features

- High Assurance Boot (HAB) memory access protection (see Paragraph 12.6 "High Assurance Boot (HAB)")
- GPS location reports and display (see Paragraph 16 "GPS Support")
- Favorite talkgroups (see Paragraph 2.1.4 "Favorite Talkgroups")
- 2048 TMO talkgroups; 1024 DMO talkgroups
- Flexible size TG folders (see Paragraph 2.1.2 "Talkgroup Folders")
- 1000 contacts
- Super groups of scan groups (see Paragraph 15.1.4 "Group Addressed DGNA")
- Covert Mode

1.1.5 IOP Features

- DCK Forwarding (see Paragraph 12.3.3 "Derived Cipher Key Encryption and Group Cipher Keys GCK (Class 3)")
- CCK per LA (see Paragraph 12.3.3 "Derived Cipher Key Encryption and Group Cipher Keys GCK (Class 3)")

- Background scanning (see Paragraph 10.4 "Roaming")
- Announced Type 2 hand over (see Paragraph 10.4 "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 2.2.10 "SwMI Initiated Group Attach/Detach")
- SwMI controlled groups (see Paragraph 2.2.10 "SwMI Initiated Group Attach/Detach" and Paragraph 15.1.1 "Adding a Talkgroup")

1.1.6 MMI Features

- Configurable Menu Tree (see Paragraph 18.6 "Configurable Menu Tree")
- Modeless operation (see Paragraph 18.1 "Modeless Operation")
- Unified Address book (see Paragraph 18.9 "Unified Address Book (Contacts)")
- Rotary lock (see Paragraph 18.2.4 "Rotary Lock")
- Programmable function keys (see Paragraph 18.14 "One Touch Keys")
- Display Flip (see Paragraph 18.4.2 "Display Flip")

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, ver 2.5.2, Nov 2005
- [Ref 2] SDSTL draft 0.13
- [Ref 3] TETRA: Security
ETS 300 392-7, TETRA V+D - Part 7: Security, ver 2.4.1, Oct 2006
- [Ref 4] TETRA: PEI
ETS 300 392-5 TETRA V+D - Part 5: PEI, ver 1.2.1, Nov 2003
- [Ref 5] TETRA: SS-DGNA S3
ETS EN 300 392-12-22 TETRA V+D - Part 12 SS Stage 3; Subpart 22: DGNA,
ver 1.4.0, Dec 2004
- [Ref 6] TETRA: SS-AL S3
ETS EN 300 392-12-21 TETRA V+D - Part 12: SS Stage 3; Subpart 21: AL,
ver 1.2.1, Nov 2004
- [Ref 7] TETRA: Address-guide
TR 102 300-5 Designers Guide - Part 5: Guidance on numbering and addressing,
ver 1.2.1, Jan 2003
- [Ref 8] TETRA: DMO
ETS EN 300 396-1 - Part 1: General Network Design, Mar 1998
- [Ref 9] DMO P3
ETS EN 300 396-3 - Part 3: MS-MS Air Interface protocol, ver 1.3.1, Aug 2006

1.2.2 MoU TIP Documents

- [Ref 10] TIP-Core
TTR 001-01, TIP - Part 1: Core, ver 5.0.0, Jan 2006

- [Ref 11] TIP SDS
TTR 001-02, TIP - Part 2: Short Data Service, ver 2.0.1, Mar 2006
- [Ref 12] TIP Auth
TTR 001-04 TIP - Part 4 - Authentication, ver 3.0.0, Jan 2006
- [Ref 13] TIP PD
TTR 001-05 TIP - Part 5: Packet Data, ver 2.0.0, Nov 2004
- [Ref 14] TIP-SS-AL
TTR 001-09 TIP - Part 9 - Ambience Listening, ver 1.0.3, Jan 2006
- [Ref 15] TIP AIE
TTR 001-11 TIP - Part 11 - Air Interface Encryption, ver 3.0.0, Sep 2006
- [Ref 16] TIP Disable
TTR 001-13 TIP - Part 13 - Enable/Disable, ver 2.0.0, Apr 2006

1.2.3 Other Standards

- [Ref 17] RFC: IP
Internet STD 5, RFC 791, Internet working Protocol (IP)
see <http://www.isi.edu/in-notes/rfc791.txt>
- [Ref 18] RFC: PPP
Internet RFC 1661, Point-to-Point Protocol (PPP)
see <http://www.isi.edu/in-notes/rfc1661.txt>
- [Ref 19] RFC: HDLC
Internet RFC 1662, PPP in HDLC-like Framing"
see <http://www.isi.edu/in-notes/rfc1662.txt>
- [Ref 20] RFC: UDP
Internet RFC 768 User Datagram Protocol. J. Postel. Aug-28-1980
see <http://www.isi.edu/in-notes/rfc768.txt>
- [Ref 21] RFC: PAP/CHAP
Internet RFC 1334 "PPP Authentication Protocols"
see <http://www.isi.edu/in-notes/rfc1334.txt>
- [Ref 22] 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 23] 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 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 all SwMIs that comply with IOP TIP documents [Ref 10] through [Ref 16].

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
CMG	Crypto Management Group
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
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 TMO Group Call service enables the terminal to communicate with a group of other TETRA terminals using 'point to multi-point' operation.

The terminal supports "Normal Group Call" as described in the Air Interface standard [Ref 1], clause 14.5.2, and the TIP [Ref 10] clause 9. Acknowledged group call is not supported.

The terminal is capable of monitoring multiple groups at one time, by adding the group identities to the list of identities which 'belong to' this terminal. Signalling received from any of these identities will be processed by the terminal.

2.1 Terminal Ergonomic features

2.1.1 Programmable Talkgroups

The terminal offers a talkgroup list facility. Each talkgroup entry contains a TETRA group address and may be associated with a name tag. Up to 2048 TMO talkgroups can be defined in the codeplug.

Note: Neither the group name nor the corresponding group address are editable by the terminal user via the MMI.

2.1.2 Talkgroup Folders

The talkgroups are organized in folders. A talkgroup can be chosen by first choosing a folder and then a talkgroup within the folder. Up to 256 folders can be provisioned. The size of each folder is flexible and can be defined via provisioning.

Note: The folder definitions cannot be altered by the terminal user via the MMI.

2.1.3 Talkgroup Selection

Talkgroup selection from the stored list of talkgroups in Idle Mode can be performed by scrolling through the list using the scroll keys or using the rotary knob if it is so provisioned as described in Paragraph 18.2 "Rotary Knob". TG scrolling can be provisioned to scroll within a folder only or continuously through the folders acting as one continuous list of groups.

There is no ability to directly dial a group SSI, nor view a group SSI.

2.1.4 Favorite Talkgroups

If the favorite talkgroups feature is provisioned in the terminal, the terminal user can mark and easily access up to 128 favorite talkgroups which are 'shortcut's to talkgroups that already exist in the talkgroup list. The favorite talkgroup list is stored in non-volatile memory.

The favorite talkgroup list can be a combined list of TMO and DMO groups; When a TMO group is selected in DMO mode, the terminal automatically switches to TMO mode and select that group. Similarly, when a DMO group is selected in TMO mode, the terminal automatically switches to DMO mode and selects that group.

2.1.5 TG Blind Operation

The terminal can be provisioned with a virtual rotary 'end-stop' option for use in blind operation. If this option is provisioned, when the user has scrolled to the beginning or end of the list using the rotary knob, a tone is sounded and the first/last talkgroup in the list continues to be the displayed group even if the user continues to scroll in that direction with the rotary knob.

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 does not allow the user to initiate a call to this group.

Note: Currently this is done on a per-folder basis. This approach will be changed in the future releases.

2.1.7 Non-Selectable Talkgroups

It is possible to provision a group to be non-selectable. Such groups are not seen by the user when scrolling through the talkgroup list, and thus the user will not be able to select the group. The user will see the group name only upon receiving a call for the group (for instance if it is an Announcement group associated with the selected group).

2.1.8 Audio Input and Output

Incoming group call audio is routed to the built-in speaker by default. It is also possible for the user to cause the audio to be routed to the built-in earpiece or to an external accessory.

Outgoing group call audio is processed from the internal 'dispatch' microphone (located on the top part of the unit) by default. It is possible for the user to cause the audio to be processed from an external accessory.

2.1.9 One Touch Group Call Access

On the idle screen the user can start a group call to the currently selected talk group, using a single PTT press.

2.1.10 Talk Time Limit

The terminal will limit the amount of time the user can continuously talk in a group call without interruption, according to a provisioned value. The user will be warned a short time before the talk time expires. The timer is provisioned per talkgroup folder.

2.1.11 Receiving a Group Call

In most situations, the terminal receives group calls without any user intervention.

When the terminal receives an incoming group call, the user may be alerted 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). However, the user has the ability to leave a group call (The call will continue to other users, but this terminal will not participate).

2.1.12 Emergency Group Call

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

2.1.13 Talkgroup Scanning

The user can choose a user scan list - a list of groups for the terminal to monitor. When this list is activated, the terminal will begin to monitor traffic for these groups in addition to the traffic for the selected group. Up to 20 user scan lists can be defined, and there can be up to 20 talkgroups in each scan list. However, only one user scan list will be active at a time. The terminal can be provisioned to allow the user to create and edit the scan list, or to not allow the user to do so.

If the SwMI instructs the terminal to detach one of the scanned groups, that terminal stops monitoring the group, but the group will remain in the user scan list. Subsequent attachment by the SwMI will cause the terminal to begin to monitor that group again.

The SwMI may also instruct the terminal to attach groups that is not in the user scan list (see Paragraph 2.2.10 "SwMI Initiated Group Attach/Detach" and Paragraph 15.1.1 "Adding a Talkgroup"). If the group attachment is accepted, the terminal monitors the group, and up to 10 such 'SwMI controlled' groups, in addition to the groups in the user scan list.

2.1.14 Priority Monitor

While the terminal is active in a group call, it may receive a group call setup for a different group. The terminal needs to decide whether to ignore the new call or accept it based on priority of the current call and the new call. If the new call has a higher priority than the current call, the new call may be joined and the current call dropped.

There are 2 types priority.

- Call priority (indicated in the call setup signalling)
- Priority of the group (indicated by the Class of Usage - CoU - negotiated upon attachment)

If the old call and new call have different call priorities, the terminal will follow the call with the higher call priority (See Paragraph 15.2 "Pre-emptive Priority Call (PPC)"). If the calls have the same call priority the CoU priority of the group will be used.

If the terminal is active in a group call, and detects a call setup for a different group call with the same call priority, and the new call is for a group with a higher group priority (CoU), if the user is not currently the talking party the terminal will join the new call.

The terminal can be provisioned to not immediately join the new higher priority call but to present the new call to the user before joining it. If so provisioned, the user is given a choice of following the new higher priority call or staying with the present call.

The terminal can be provisioned to treat a selected group call as a higher priority than an scan group call regardless of the priority of the calls or the groups.

2.1.15 Announcement TalkGroup (ATG)

The terminal supports the concept of a group hierarchy, such that a special group, an announcement group, in addition to being a group in and of itself, logically contains up to 20 subgroups. When the user selects an announcement group as the selected group, the terminal will monitor traffic received for the announcement group as well as the traffic received for any of the associated subgroups. However, the terminal will 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 will be monitored as well as the traffic for its announcement group (but not other subgroups).

The terminal can be provisioned to not allow the user to initiate a call or talk back on announcement talk groups.

2.1.16 Super Groups

See Paragraph 15.1.4 "Group Addressed DGNA".

2.1.17 Broadcast Call

The terminal will join calls received with Communication Type "Broadcast" and will display to the user that this is a broadcast call. This call will normally be addressed to the 'broadcast address' (0xFFFFF), but will be accepted by the terminal on any address the terminal is monitoring.

A Broadcast call will take precedence over any other call that has the same or lower call priority. The terminal does not allow the user to transmit in a broadcast call.

Limitations

The terminal does not have the ability to initiate a broadcast call.

2.2 Air Interface Aspects

2.2.1 Group Call

The terminal is able to make and receive group calls to and from other TETRA terminals with half-duplex speech capability. Group call uses TETRA group call signalling as described in [Ref 1] and [Ref 10] using direct set-up for incoming and outgoing calls.

Group calls are normally owned and cleared down by the infrastructure. However, group ownership is supported by the terminal - see section 2.2.3 "Call Ownership" on page 2-11.

2.2.2 Talking Party Identification

The Talking Party is displayed as specified in section 3.2.4 "Calling Party Identification Presentation" on page 2-15.

2.2.3 Call Ownership

The terminal accepts call ownership of a group call. When the terminal is the call owner it will send an appropriate TETRA signalling when the user ends the call.

2.2.4 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 terminal 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.

2.2.5 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 terminal 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 terminal is in Emergency Mode the transmission request is not ignored.

2.2.6 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 section 10.4 "Roaming" on page 2-33 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.

2.2.7 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.

2.2.8 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 2.1.14 "Priority Monitor") it will ignore a group call 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.

2.2.9 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 re-attaching 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 an appropriate TETRA signalling (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 an appropriate TETRA signalling (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).

2.2.10 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.

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)

The Private call service enables the terminal to communicate one-on-one with another TETRA terminal when in TMO mode.

The terminal supports Individual call service to a TETRA identity as described in the Air Interface standard [Ref 1], clause 14.5.1, and the TIP [Ref 10] clause 7.

3.1 Terminal Ergonomic Features

3.1.1 Private Call Address Book

See Paragraph 18.9 "Unified Address Book (Contacts)".

3.1.2 Terminal TETRA ID Display

The user is able to view his name and/or his own ISSI address. This information is read from the codeplug. This information is used for display purposes only and has no affect on the terminal operation.

3.1.3 Dialing Methods

The terminal supports the following methods for selecting a number for an outgoing private call:

- Via Contact list
- One Touch Button
- Via Call History list

The detailed description of the different dialing methods is shown in the Paragraph 18.10 "Dialing Methods".

3.1.4 Initiating a Private Call

After selecting or entering a target address, the user may press PTT to initiate a half-duplex private call, or may press the <Send> key to initiate a Mobile to Mobile (or Mobile to Console) full duplex call.

When the user is involved in a half-duplex or full-duplex call, the <End/Cancel> key will end the call.

If the user initiates a half-duplex private call, the terminal will respond either with a talk permit tone to indicate that the call is through-connected or an alerting tone indicating that the called terminal is ringing.

3.1.5 Receiving a Private Call

3.1.5.1 Half-Duplex/Full-Duplex Operation

Incoming private calls can be either half-duplex or full-duplex. On receipt of a half-duplex call with on/off hook setup, or a full-duplex call setup, the terminal rings. In a half-duplex call, the user then presses and holds PTT to talk. On a full-duplex call, the user accepts the call by pressing <Send>, and the full-duplex call is established.

3.1.6 Talk Time Limit

In a half-duplex call, the terminal limits the amount of time the user can continuously talk without interruption according to a provisioned value. The user will be warned a short time before the talk time expires.

3.1.7 Terminating a Private Call

The user is given the ability to terminate a half-duplex or full-duplex private call by pressing the <End/Cancel> key.

3.2 Air Interface Aspects

3.2.1 Half Duplex Private Call

The terminal is able to make and receive private calls to and from other TETRA terminals with half-duplex speech capability. This call type will use TETRA individual call signalling.

All private calls are initiated using the 'On-off hook' method. For incoming calls, both direct and on-off hook setup will be accepted by the terminal.

3.2.2 Full Duplex Private Call

The terminal is able to make and receive private calls to and from other TETRA terminals with full-duplex speech capability. It is possible to provision the terminal to not allow the user to initiate Full duplex private calls.

The terminal always initiates full duplex private calls using on/off hook signalling with the traffic channel allocated by the SwMI only after the called party has answered the call. Therefore, all progress tones during call setup will be generated by the terminal. In addition, the terminal will allow the SwMI to modify the call setup to 'direct', thereby enabling the infrastructure to generate the progress tones.

3.2.3 Call Restoration in Private Call

If the terminal roams while the user is the transmitting party in the private call, and it is possible to perform announced cell reselection, announced cell reselection will be employed as described in section 10.4 "Roaming" on page 2-33 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.

3.2.4 Calling Party Identification Presentation

The calling party TETRA identity may be transported as part of the incoming individual call set-up signalling (as described in [Ref 1]). If the identity can be interpreted as a short number (see Paragraph 13.1 "Short Addressing Schemes"), the short number is displayed to the user. In addition, if the number is programmed in the terminal address book, the name associated with that number is displayed as well. If the calling party identity is not present in the call set-up signalling, the terminal displays a blank line in place of the missing identity.

3.2.5 Private Call Modification

If a Private Duplex call is initiated by the terminal, and the SwMI modifies the call to a Group call, or a Half-Duplex Private call, the terminal will accept the modification and present it to the user. In addition, if a half-duplex private call is initiated as a direct call, the terminal will accept modification to an on-off hook call, and vice-versa.

If the SwMI modifies a call from hook to direct the terminal will accept the modification.

4 Phone Call (TMO)

The Telephone call service enables the terminal to communicate in a one-on-one full-duplex conversation with another terminal (TETRA or non-TETRA) via a telephone switch when in TMO mode.

The terminal supports Individual call service to an external identity as described in the Air Interface standard [Ref 1], clause 14.5.1 (and in particular clause 14.5.1.2.6), and the TIP [Ref 10] clause 12.

4.1 Phone Modes

There are two phone number call types - a full phone number, which is addressed to the defined PSTN gateway address, or a PABX phone number, for internal calls, where the numbers dialed will be addressed to the defined PABX gateway address.

No more than one PSTN gateway ID and one PABX gateway ID is available in the terminal.

4.2 Telephone Ergonomic Features

4.2.1 Telephone Address Books

See Paragraph 18.9 "Unified Address Book (Contacts)".

4.2.2 Dialing Methods

The terminal supports the following methods for selecting a number for an outgoing telephone call in either Phone Mode or PABX Mode:

- Via Contact List
- One Touch button
- Via Call History list

For the different dialing methods description see Paragraph 18.10 "Dialing Methods".

4.2.3 Ring Styles

The terminal allows the user to select one of the available different ring styles for incoming phone calls.

4.3 Air Interface Aspects

The terminal supports the telephone-related functions listed below.

4.3.1 Initiating a Telephone Call

The terminal is able to initiate telephone calls to a PSTN/PABX with full-duplex speech capability. This call type will use TETRA individual call signalling as described in [Ref 1] and [Ref 10] using single stage dialing and hook set-up for outgoing calls.

Using hook signalling for Phone calls, implies that until a traffic channel is allocated, all feedback tones are generated internally by the terminal. In addition, the terminal will accept SwMI modification of the call setup to 'direct', thereby enabling the infrastructure to generate the progress tones.

Telephone calls can also be made between TETRA terminals using the terminal-ISDN number as the called party number.

Half-duplex telephone calls are not supported.

4.3.2 Receiving a Telephone Call

Incoming Telephone calls (Land Gateway to Mobile) will use on/off hook signalling. The terminal will extract the gateway ID from the call set-up signalling, to determine whether to enter Phone or PABX mode upon receiving the call.

4.3.3 Call Restoration in Phone Call

If the terminal roams while the user is in an active phone call, and it is possible to perform announced cell reselection, announced cell reselection will be employed as described in Paragraph 10.4 "Roaming" and call restoration procedures will be performed.

4.3.4 Calling Line Identification Presentation (CLIP)

If the terminal is provisioned to display the calling party, the calling party number will be transported as part of the incoming call set-up signalling (as described in [Ref 1]) and shown on the terminal display to the user. If the calling party ID is programmed in the terminal with a corresponding name, the name will be displayed to the user in addition to the number.

Note: It is expected that the number sent by the SwMI will be in a form that can be used by the called user to call back the calling party at some other time. Thus, for instance, the number can be stored by the user as-is in the address book.

If the calling party number is not present in the incoming call set-up signalling, a blank line is displayed to the user in its place.

5 Emergency Operation (TMO)

This section describes Emergency Operation in TMO Mode.

The terminal has a dedicated emergency button which can be provisioned to start either an emergency group call or an emergency private call (half-duplex or full-duplex). It is also possible to invoke emergency by an emergency button on the RSM.

5.1 Emergency Group Operation

5.1.1 Emergency Group Mode

If Emergency Call is provisioned as a group call, upon pressing of the dedicated emergency key (or RSM button or emergency foot switch if connected) the terminal will enter a special emergency mode.

Upon entry into Emergency Mode any existing voice call will be aborted or cleared down. Packet data in progress will be aborted, however the session will be kept open.

In Emergency Mode, the terminal will automatically reject phone, PABX and private calls, and will not monitor the groups in the user selected scan list. If an ATG is the selected group, however, the terminal will monitor the sub-groups associated with the ATG.

The terminal will remain in Emergency Mode until the user explicitly exits.

5.1.2 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.

5.1.3 Emergency Group Call

The user is able to initiate an emergency group call in Emergency Mode only, but is able to 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.

5.1.4 Hot Mic

If the terminal is provisioned with the Hot Mic feature, upon entry into emergency mode, the terminal will set up an Emergency Group Call, and when granted transmission permission will open the microphone automatically, allowing the user to transmit voice without pressing or holding any PTT button. Transmission will continue for a provisioned amount of time. Subsequent presses on the emergency button within emergency mode will initiate Hot Mic transmission again.

Pressing of PTT during hot mic transmission will stop hot mic operation, and normal PTT operation will take over (that is when PTT is released transmission will stop).

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.

5.3 Air Interface Aspects

5.3.1 Emergency Identity and Call Type Modification

The terminal supports initiation of an Emergency call to a designated TETRA ID. If the SwMI modifies the call type to another call type, the terminal will follow the new call.

If emergency call is provisioned as a private call, and the SwMI modifies it to a group call the terminal will accept this modification and convert the call to a group call in emergency mode. In this case, the terminal will automatically leave Emergency Mode as soon as the group call ends.

6 Direct Mode Operation (DMO)

TETRA DMO enables the terminal to directly communicate with another TETRA terminal or group of terminals directly, without the need of an intervening base station.

The terminal supports Direct Mode Operation service identity as described in the Air Interface standard [Ref 8].

6.1 DMO Mode

To communicate directly with another terminal not through a SwMI, the user enters into a special mode that allows Direct Mode (DMO) communication. To return to normal operation, the user switches back to Trunking (TMO) mode.

In DMO mode, the user is prevented from changing modes to private, PABX or Phone modes. All menu items are available, although some functions from the menu are restricted (sending status messages for instance).

In DMO mode, the RSSI level is displayed to the user only when the terminal is receiving.

6.2 DMO Group Call

The user can initiate a DMO group call and participate as a listener of a DMO group call.

The user can select one of up to 1024 groups, each of which has an associated DMO frequency. There will be a mapping between DMO and TMO talkgroups, such that when moving from TMO to DMO or vice-versa the appropriate group will be selected. Calls initiated by the terminal will be to the selected group. Only incoming calls to the selected group and the open group (See Paragraph 6.5 "DMO Inter-MNI Calls") on the selected frequency will be joined by the terminal; TG scanning is not supported.

The terminal supports call initiation and acceptance of call changeover, enabling the talker ("DMO master") to change within a DMO group call.

If Talking Party ID (TPNI) is received in an incoming group call transaction (or received in DM-INFO) it will be displayed to the user. It will also be sent by the terminal in outgoing group transactions.

The terminal will send late entry signals ("occupation messages") periodically while transmitting in a DMO group call. The terminal will detect late entry signals sent out by other DMO terminals.

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 terminal to terminal 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 pre-emption. 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

The terminal supports receipt of DMO group calls addressed to the "Open MNI" (MNI and SSI all '1's), and those addressed to the "Open Group" (SSI is all '1's) with the home MNI or the MNI of the currently selected group.

The terminal has a list of partnership DMO networks. If a call is received to the SSI of the selected group and an MNI that is in the partnership list, the terminal will join the call if the selected group is provisioned to enable partnership.

The terminal supports initiation of a DMO group call to any provisioned GTSI. 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 IOP certified gateways as defined in [Ref 23].

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 3 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.
- **Auto 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 and/or a DMO repeater.

If either 'Specific gateway' or 'auto 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 and/or repeater, the terminal will indicate this to the user.

7 SDS - Short Data Services

The terminal in TMO Mode supports 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

The terminal supports SDS Transport Layer services which provide end-to-end acknowledgments, delivery report requests, message numbering, and so forth for SDS User Defined Data type 4 messages. The TL also provides SDS access for applications that do not request these transport layer services, but use a Protocol Identifier.

The terminal can be provisioned to always send the delivery report by using an appropriate TETRA signalling, even if the originator requested a short report.

The terminal can be provisioned to support the old SDS-TL standard (as described in [Ref 2]) for operation on legacy systems, or as defined in [Ref 1] clause 29 for operation on other SwMIs.

7.1.2 External SDS Application Support

An externally connected device may access the SDS services in the terminal via AT commands. An external application may use this service to send and receive SDS status, 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. If an external application has registered with the terminal for that PI, the terminal will deliver the message to the target application

The terminal may receive downlink SDS messages that are successive retransmissions of a message already received and acknowledged by the terminal. The terminal will not display these messages to the user, nor store in them in the inbox, nor send them to an external application.

7.2 SDS Addressing

The terminal will accept SDS messages sent to any of the following addresses:

- The terminals TETRA individual address
- Any group address that the terminal is monitoring
- The TETRA broadcast address

The terminal allows the user to send an SDS messages to any TETRA address (see section 13 "Numbering and Addressing" on page 2-41) and this address will be used as called user address.

7.3 Pre-Defined Status

7.3.1 Sending Status

The mobile status service is provided using SDS Status [Ref 1], clause 13. The terminal user can select from a list of up to 100 pre-programmed alphanumeric aliases each of which corresponds to a status value. The valid range of uplink status values is a set of provisioned parameters (min/max).

If the terminal is not provisioned for targeted status, the status value will be sent over the air interface to the address of the selected group.

The terminal will recognize the General status ack sent by the SwMI, as well as negative acknowledge as defined in [Ref 10].

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 terminal should not initiate sending of status messages on a traffic channel.

7.3.2 Targeted SDS Status

If the terminal is provisioned for targeted status, the status value is sent over the air interface by default to the target last sent to. The user also has an option to specify a different individual user or group to send the message to.

7.3.3 Receiving Status

The terminal accepts status messages on any address it is monitoring. The terminal can be pre-programmed with the appropriate text associated with each status value.

The user is notified when a new status message has been received.

Upon receiving an incoming status message, the stored text corresponding to the status value will be extracted and placed in the text message buffer as a text message. Receiving a status will cause the terminal to display the message mail screen, allowing the user quick access to read the message. A received status can be stored in the terminal text message buffer.

7.3.4 PEI Access to Status

The PEI provides access for external applications to send and receive status messages (See Paragraph 7.1.2 "External SDS Application Support").

7.4 Text Message Service

The terminal supports an internal text messaging application using the TETRA SDS Transport Layer (see Paragraph 7.1.1 "Transport Layer Services").

The terminal is capable of sending and receiving up to 140 bytes of payload data (which can be up to 160 characters if 7-bit encoding is used).

7.4.1 Sending a Text Message

The terminal provides an edit facility for composing and editing a text message.

IMPORTANT: Editing is available only for the full keypad terminal.

The message can be sent to a target TETRA terminal using SSI addressing, and will be sent with a request for a received delivery report.

7.4.2 Receiving a Text Message

Upon receiving a text message, the terminal will place the text into a circular buffer. The user will be notified when a new text message has been received and quick access to read the message will be provided.

If a delivery report is requested, it will be sent by the terminal upon receipt of the message by SDS-TL.

If a consumed report is requested, it will be sent when the user reads the message.

Note: If the user reads the message when the terminal is out of service, the report may not be sent.

7.4.3 Saved Text Messages

IMPORTANT: Editing is available only for the full keypad terminal. The user is given the ability to save incoming or edited (outgoing) text messages. These messages can be edited and sent and will be only capable of being erased by explicit action from the user.

7.4.4 Timestamp

The timestamp displayed to the user will be extracted from the SDS TL PDU (as specified in the TETRA SDS Transport Layer Standard - see [Ref 11]). The timestamp will be generated and inserted into the message by the SwMI.

7.5 SDS Type 4 (Other than Text Message)

7.5.1 Home Mode Display

This feature provides the ability to configure over-the-air, text that will be shown by default on the terminal's display.

If this feature is enabled, the terminal displays a text string to the user on the idle display as specified in Paragraph 18.1.1 "Idle Display". This text can be provisioned in the codeplug.

Upon receipt of an SDS User Defined Type 4 message with a predefined Protocol Identifier for Home Mode Display (this PI will be provisioned in the codeplug), the terminal will replace the previous string with the string received in the SDS message. This new text will be used until power down, or until another is received. If an empty text is received, the terminal will revert to the text provisioned in the codeplug.

7.5.2 ATS Entry Prompt (a.k.a Predefined Templates)

This feature assists the terminal in sending correctly formatted messages that are intended for computer applications.

IMPORTANT: Editing is available only for the full keypad terminal. The terminal user is provided with the ability to select a predefined entry prompt which will define a message format to assist in the construction of an SDS message. The prompt definition can be provisioned in the codeplug. The definition defines areas that are 'read-only' and areas that can be editable, as well as the type of characters that can be entered (numeric, alpha-numeric or phone digits). Along with the message definition will also be the address to send the message to.

When the user sends the message it will be sent via SDS-TL with Protocol Identifier that is provisioned in the codeplug, and a received report will be requested.

7.6 Air Interface Aspects

7.6.1 SDS-TL Short Form Report

The terminal can be provisioned to send a 'short-form' SDS-TL receive report when the originator of the message allows short-form report. 'Short-form report' uses specially designated SDS status values instead of SDS-REPORT.

7.6.2 Text Message Addressing

In addition to support of targeting text messages to a TETRA individual address, the terminal can be configured to support addressing of a text message to a TETRA group or to a telephone number. Addressing an SDS message to a phone number is implemented by using it's MS-ISDN number as an External Subscriber Number and the telephone gateway ID as the called user.

The terminal does not display to the user nor send to the external application SDS messages that appear to be group messages sent from this terminal.

7.6.3 Text Message Coding Scheme

The terminal supports the coding schemes for text messages:

- ISO/IEC 8859-1 Latin 1 (8 bits)
- 7-bit alphabet (for GSM compatibility)
- UCS-2/UTF16 (ISO-10646 [2000])

When sending a message to a PSTN number, 7-bit encoding will always be used. When sending a message to an SSI or FSSN, 8-bit or UCS-2 encoding will be used (as provisioned).

The terminal will decode downlink messages that use any of the above coding schemes, irrespective of the source.

7.6.4 Service Center

The terminal support SwMIs that employ store-and-forward service as indicated in the cell's broadcast information.

The terminal supports use of a service center, whose address is provisioned in the terminal. Store and forward operation is supported. However, the terminal will only notify the user upon successful sending of the message, and not wait for the report from the service center. This is due to deficiencies in the air interface that do not account for long lifetime of messages (for example: The Message Reference provides a very short range of values).

7.6.5 User Defined Data Types 1, 2 and 3

Downlink SDS messages types 1, 2 and 3 are always 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.

8 Call-Out

8.1 Feature Overview

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

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.

8.1.1 Addressing Call-Out

Call-out alert can be addressed to:

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

8.1.2 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.

8.1.3 New Call-Out

When the new Call-Out is received by the terminal, the old Call-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.

8.2 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 terminal 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.

8.3 Exception Handling

8.3.1 Emergency mode

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

8.3.2 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 terminal will prompt to accept, standby or reject the call-out.

8.3.3 Direct Mode Operation (DMO)

Call-Out feature is not supported in DMO.

8.3.4 Fallback Mode

This mode is available when users are in Local Site Trunking. In case of the Fallback mode an MS user is able to initiate a Call-Out call. The receiver-MS enters the Call-Out Fallback mode, which includes only voice communication, upon receiving the Call-Out call. The user can clear the Fallback mode only manually.

8.3.5 Call-Out test

Dispatcher is able to test this feature by using Call-out test. Terminal 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.

8.3.6 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 reliability.

9 Packet Data (TMO)

The terminal provides, in TMO Mode, a TETRA bearer service for applications that use the IP protocol, as described in the TETRA standard [Ref 1] clause 28, and the Packet Data TIP [Ref 13].

External applications will be able to use this service by connecting via the PEI interface, as described in Paragraph 14 "PEI Characteristics".

9.1 General

The terminal supports TETRA standard multi slot packet data using the IP network layer protocol [Ref 17] via PPP [Ref 18], and TETRA SMDCP protocol as defined in [Ref 1], clause 28.

An IP connection is established between TE2 and MT2, allowing external applications to communicate with TE2 using predefined IP addresses.

Note: This will be referred to as the 'local link'. The link established between the terminal and the SwMI will be referred to as the 'wide link'. When a wide link has been established, the terminal will be considered to be in **Wide Mode**.

Packet data applications reside internally, over UDP, or in an externally connected device connected via an 8-wire RS232 data port in the terminal. Communication to the external terminal are initialized using AT commands as defined in the TETRA PEI standard [Ref 4]. Once the connection is established, the external application may request PPP mode, and will then operate in PPP mode until the data connection is terminated.

9.2 Connectivity

The system provides point to point IP connectivity, which means that the following datagram exchanges are possible:

- Terminal <-> External Equipment (TE2) - PC and so forth.
- External Equipment (TE2) <-> Network (via Terminal)

9.3 Packet Data Terminal Interface

The terminal supports only IP version 4 packets.

The terminal routes datagrams independent of the protocol sitting on top of IP.

The terminal supports an MTU of 1500 bytes.

The terminal provides a best effort delivery service. However, if delivery fails, the originating user application will be informed by sending back to TE2 an ICMP message, if possible.

9.4 Voice + Data Feature Support

The terminal is capable of alternating voice and packet data service, but voice and data in parallel is not supported. According to [Ref 1], this corresponds to Packet Data Type B - IP dual mode. If the SwMI rejects the context activation due to 'PD MS type not supported', the terminal shall re initiate context activation indicating that it supports 'Type C' (This is to accommodate legacy SwMIs that use the older definition of these types).

The terminal supports transmission and receipt of SDS on the packet data channel. Thus these services may be conducted in parallel.

The terminal can be in one of the following Voice-Data interaction modes:

9.4.1 Voice Only Mode

The user has the option of selecting "Voice Only mode", in which Packet Data service is disabled. If an external application attempts to start up in this mode, packet data registration for a 'wide link' (see Paragraph 9.1 "General") will be rejected. If packet data service is active when this mode is selected the packet data will be deactivated by the MT. The PEI will operate in 'local mode' only.

9.4.2 Data Only Mode

The user has the option of selecting "Data only mode", in which normal voice calls are not permitted. Incoming non-emergency voice calls will be rejected, and the user will not be able to initiate non-emergency voice calls. Incoming and outgoing Emergency calls are allowed.

9.4.3 Voice & Data Mode

In "Voice & Data mode" any voice call activity that occurs during a data session will have priority over packet data.

Once the data session was interrupted by a voice call, the PD session will be suspended, until the voice activity has ended, when the session will be resumed.

Voice Priority mode is the default mode. If the user has never explicitly selected an interaction mode, the mode will be voice priority.

Service and feature interaction in the defined above modes is described in Paragraph 9.13 "Voice + Data Service and Feature Interaction".

9.4.4 Data Interaction User Menu

The user is given the ability to choose one of the above interaction modes. The choice of interaction mode will be stored in non-volatile memory and remembered at power up.

9.5 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.

9.6 Priority of Packet Data

The packet data service PDCH access signalling has the same priority as circuit mode setup related signalling. Interaction between Packet Data and Voice calls is shown in Paragraph 9.13 "Voice + Data Service and Feature Interaction".

9.7 Terminal Generated ICMP Messages

The terminal will generate ICMP messages addressed to the TE2 in case of non-delivery caused by the terminal environment. The non-delivery causes will include for example:

- No radio coverage
- Failed transmission
- Service interaction

9.8 IP Addressing

9.8.1 Wide IP Address

An IP address may be assigned to the terminal by the SwMI during the PDP context activation. When assigned, this address is used by both TE2 (and MT2) applications as the source address in IP packets to be delivered to the infrastructure, and received as a destination address of the IP datagrams received from the infrastructure.

9.8.2 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.

9.9 Advanced Link

Advanced Link is used for PD transmission.

Advanced link flow control is supported by the terminal.

Advanced Link Roaming, where the Advanced link is not disconnected between cells, is supported (assuming support in the SwMI).

9.10 IP Compression

The terminal does not support data compression. If an application attempts to negotiate data compression during context activation it will be rejected. If a data compressed IP packet is received from the SwMI, it will be silently discarded.

The terminal does support IP header compression negotiation received from TE2 during PDP context activation, and will transparently transfer IP packets with header compression between TE2 and the SwMI.

9.11 Terminal Roaming

The packet data service employs the TETRA standard cell selection and re-selection, in other words "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 reselection 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.

9.12 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 performed 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 21]) 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 (for example: PAP), the SwMI can reject it.

9.13 Voice + Data Service and Feature Interaction

9.13.1 Voice Service Interaction

In Voice & Data Mode, if a voice service causes the terminal to move to the traffic channel, the terminal will terminate any active packet data transmission or reception, and suspend packet data service. The data service will resume when the voice service ends.

9.13.2 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.

10 Mobility Services

10.1 Main Control Channel Frequencies

The terminal is capable of finding a wide range of main control channels. This is done by maintaining stored lists of carrier frequencies which are scanned in order.

1. A dynamic list of up to 32 discrete entries that is maintained only by the terminal software.
2. A static list of up to 32 discrete frequencies specified by the operator that can be pre provisioned. The system operator can modify this list via the programming tool.
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.
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.

10.2 Multi-System Operation

In this release full migration is not supported. However, multi system operation is supported as described below.

10.2.1 List of Allowed Networks

The terminal holds a list of up to 100 allowed network identities (MCC/MNC combinations) that are considered 'friendly' networks. The first network in this list must be the terminal's home network. Each network can have an associated name that can indicate to the user which network it is.

The terminal will be capable of performing initial cell selection and registration on these Networks - and only these Networks. Registration on any of these networks will be performed using the terminal's ISSI and without migration signalling. The same ISSI will be used on all networks.

The user is given an option to limit registration to the home network only, or to a selected network only, and to ignore the other allowed networks. This is described below.

10.2.2 Home-Only Mode

In Home Only mode the terminal will only recognize the first system in the Allowed list. As a result, the terminal will only register on its home network, even if a foreign network is in range and is found first.

10.2.3 Selected Network Mode

In Selected Network mode the terminal will only recognize the system in the Allowed list that has been selected by the user. As a result, the terminal will only register on this selected network, even if a foreign network is in range and is found first.

10.2.4 Switching Between Network Modes

The user is given the ability via the MMI to switch between Home Only mode, and Selected Network mode. If the terminal chooses Selected Network mode, the user will be shown the list of allowed networks from which to choose from.

If the terminal is in a foreign network and the user switches chooses a network that is different from the current network, the terminal will force initial cell selection to find a cell that belongs to the Home or the selected network.

10.2.5 Services

The terminal will operate in all networks as it does in its home network. All calls will be made using SSI addresses, and it is the SwMI responsibility to reject calls for subscribers or groups that cannot be reached in the local system.

Note: It is assumed that telephone numbers with the country code of the local country will be understood by the telephony gateway and dialed to the local number without the country code (for example: if the user dials the number +44-1256-48-4566 in the UK, it will be treated as if the user dialed 01256-48-4566.)

10.2.6 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 10.2.4) 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.

10.3 Registration

Note: Security aspects of registration is covered in Paragraph 12 "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 terminal's 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.

10.4 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 an appropriate TETRA signalling 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.

10.5 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.

10.6 Local Site Trunking (LST)

Local Site Trunking (LST) is a feature that allows a base station to operate as stand-alone when the link from the local cell to the central switch has gone down. The terminal will limit functionality when the cell is in this mode

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

When the terminal is operating on a LST cell, the terminal will prevent the user from invoking the following services:

- Private Call
- Phone Call
- PABX Call
- Packet data
- SDS data (for example: Status, Text message)

When the terminal is operating on a LST cell, it will always search for a cell that provides system-wide services, and roam to such a cell as soon as it becomes available.

10.7 More Air Interface Aspects

10.7.1 Multi-Cell Location Areas

If the terminal roams to a new cell that is in the same location area as the old cell, the terminal will not perform registration.

10.7.2 ASSI Support

The terminal will accept an ASSI assignment sent by the SwMI in response to the terminal's registration request. This address will be used by Layer 2 layer and below only and will not be visible to the user application. If the system is one of the allowed networks (as specified in Paragraph 10.2.1 "List of Allowed Networks"), the terminal's ISSI will also be monitored on the downlink.

11 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.

11.1 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.

11.2 Connectivity

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

- Terminal <-> External Equipment (TE2) - PC and so forth.
- 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 data services over a common PPP link.

11.2.1 IP Addressing

11.2.1.2 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.

11.2.1.3 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".

11.2.2 Port Addressing

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

11.3 Service and Feature Interactions

11.3.1 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).

11.3.2 DMO Mode

The terminal disables the TNP1 session while in DMO.

11.3.3 SDS and Packet Data

TNP1 implementation allows SDS and Packet Data transmission simultaneously.

11.3.4 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.

12 Security Services

The terminal provides TETRA security features as described in the TETRA standard [Ref 3] clause 28, and the TIPs [Ref 15], [Ref 16].

Unless stated otherwise, this chapter describes security services in TMO Mode only.

12.1 Terminal Equipment Identifier

The TEI will be programmed into the terminal at the factory and cannot be subsequently modified.

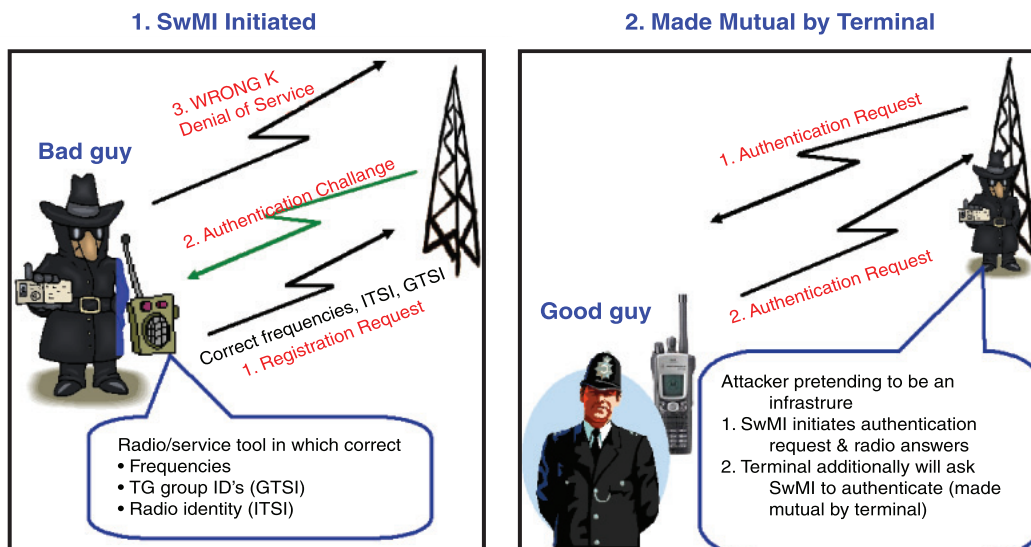
12.2 User Authentication

User authentication provides the basic protection mechanism against unauthorized terminal operation on the network. It is based on a common authentication key (K) shared by the terminal and the SwMI and used in a challenge-response-result protocol initiated by the SwMI during the registration process.

The terminal supports SwMI initiated user authentication as defined in [Ref 3] Clause 4, using the TA11 algorithm to derive the Session Key (KS) and the TA12 algorithm to derive the expected result (XRES1) expected in the SwMI response.

If the terminal is provisioned for mutual authentication, whenever the terminal is authenticated by the SwMI it will authenticate the SwMI. Mutual authentication can be configured as mandatory.

Note: Terminal initiated authentication of the SwMI is not supported.



Agenda to the picture above

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

12.3 Air Interface Encryption (AIE)

The terminal supports TETRA Air Interface Encryption AIE by using the Standard TETRA Public Encryption algorithms, as defined in [Ref 3] Clause 6, TEA1 and TEA2.

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:

- The number of key combinations makes unauthorized deciphering almost impossible.

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.

12.3.1 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.

12.3.2 Static Cipher Key Encryption (Class 2)

The terminal supports static air interface encryption, using a set of up to 32 static cipher keys (SCK) which is shared by the SwMI and all authorized terminals. The terminal will determine which static key to use based on the SCK Number (SCKN) and SCK version number (SCK-VN) broadcast by the SwMI.

A terminal can be configured to support static key encryption, in which case it will identify itself in registration as a 'Security Class 2' terminal, and attempt to negotiate Security Class 2 encryption. Each terminal will use either the TEA1 or the TEA2 (TEA 3 - AsiaPac) Key Stream Generator (KSG) algorithm, and contain only one of those algorithms in its software.

When Security Class 2 Encryption has been negotiated, encrypted PDUs will be encrypted using SCK.

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.

12.3.3 Derived Cipher Key Encryption 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.

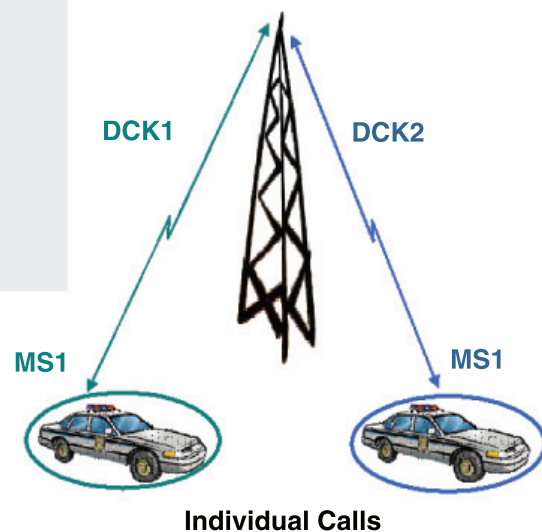
The DCK is derived from either the one way or mutual authentication process and the CCK is received during registry. GCK is received through OTAR mechanism only.

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”

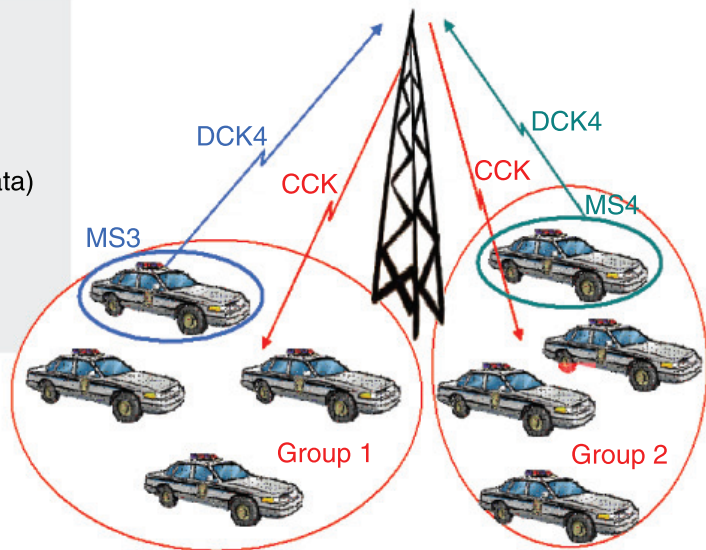


Class 3 DCK: Strong Individual Protection for Each User

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:

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.

12.3.4 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.

12.3.5 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.

12.3.6 AIE Key Storage

The terminal stores all 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.

12.3.7 User Key Deletion

User can delete Encryption & / or Authentication keys by a special sequence from the keypad. The key deletion key sequence is: Side Button 1, Side Button 1, Side Button 1, Side Button 2, Side Button 2, Side Button 2.

Benefits:

- This allows user to clear the keys for example for transit.

12.4 Terminal Disable/Enable

Terminal disable using TETRA Temporary Disable is supported.

Upon reception of an appropriate TETRA signalling for "Subscription Disable" with the correct SSI and MNI of the terminal, the terminal will be disabled. Also if the encryption keys are erased, the terminal will put itself in the disabled state.

When disabled, the terminal will not participate in any voice call, SDS nor packet data activity and will ignore all Supplementary Services sent on the downlink. All visible and audible indications will be disabled, and the terminal will appear to be powered off. All user inputs (key presses, knob operation) will be ignored, and the PEI interface will be closed.

The terminal can be provisioned to show the user a message upon becoming disabled.

The terminal will continue to perform Mobility Management functions, such as roaming, in order to facilitate subsequent enabling (or further disabling) of the terminal.

The terminal will store the disabled/enabled state in the codeplug, such that if the unit is powered down and subsequently powered up it will remain in that state.

If the terminal is in the disabled state, and receives an appropriate TETRA signalling with the correct SSI and MNI of the terminal, the terminal will be restored to its normal operative state.

Upon reception of an appropriate TETRA signalling for "Equipment Disable" with the correct TEI for this terminal, the terminal will be disabled.

If the terminal is in the equipment disabled state, and receives an appropriate TETRA signalling 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).

12.5 Terminal Permanent Disable

Permanent disabling is intended to protect a network from attack from a compromised or faulty terminal. It can be used when the terminal 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 terminal would need to be recovered and reprogrammed before it could be used again.

When the terminal is permanently disabled, it becomes inoperable:

- All its security key material, that is GCK, GSKO, DMO SCKs, Ks, DCK, CCK, TMO SCKs are deleted.
- All its Codeplug is deleted.

- All its Software is deleted.
- All its MMI interfaces on the terminal are disabled.

The Permanent Disable is recommended to be invoked when it has been determined that a terminal is absolutely unrecoverable. When a terminal has been lost or stolen, the first step always is to stun (Temporary Disable) the terminal.

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 terminal in the PrC and the AuC that lies within the cluster where the terminal'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 terminal'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 terminal 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.

12.6 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.

13 Numbering and Addressing

Each terminal has a TETRA ITSI which is used for addressing the terminal over the air interface. However, it is undesirable to require the user to enter a long number to address another terminal. To this end, a number of short number schemes can be used.

13.1 Short Addressing Schemes

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

13.1.1 Short Number Dialing using ISSI

IMPORTANT: This feature is available only for the full keypad terminal.

If the terminal is provisioned 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 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 will be capable of utilizing short 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

13.2 Direct TETRA ID Addressing

13.2.1 ISSI

IMPORTANT: This feature is available only for the full keypad terminal. 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.

14 PEI Characteristics

The terminal supports a four-wire serial RS232 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].

14.1 Physical Layer

The terminal PEI physical layer is the RS232 interface and supports the following circuits as specified in [Ref 22]:

- 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.

14.1.1 Baud Rate

The terminal supports the standard PEI baud rates specified in [Ref 22] from 300 bps to 57,600 bps. The auto baud rate detection mechanism is not supported.

14.1.2 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.

14.2 PEI Link Layer

The terminal supports AT commands and PPP [Ref 18] as a link layer between the TE2 and MT2.

PPP negotiation will use unnumbered mode only.

The AT phase is compatible with the Windows[®] operating system standard modem type.

14.3 AT Commands

14.3.1 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)
- SYSINFO (+CTSYSI)
- Control flow control (+IFC)
- Verbose Mode toggle (V)
- Restore Default Configuration (Z)
- Command line Termination Character (S3)
- Terminal Success Reply (OK)
- Terminal Error Reply (+CME_ERROR)

14.3.2 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)

14.3.3 Short Data AT Commands

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

- Service Center Capability (+CTSYSI)
- Send SDS Message (+CMGS)
- Receive SDS Message (+CMT)
- SDS Message Stack Behavior (+CNMI)
- PI Registration (+CMGS)
- PI De-registration (+CMGS)

14.3.4 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)

14.3.5 TETRA Modes AT Commands

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

- TMO/DMO Operating mode (+CTOM)

14.3.6 Group Management AT Commands

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

- Talkgroup selection (+CTGS)

14.3.7 DMO AT Commands

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

- Visible DMO Gateway or Repeater (+CTDGR)

14.3.8 USB Support

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

15 Supplementary Services

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

15.1 Dynamic Group Number Assignment (DGNA)

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

15.1.1 Adding a Talkgroup

When a dynamic group number assignment to add a new talkgroup is received, the terminal will add the group in the first available spot in the talkgroup list in the codeplug. The user can then scroll to the talkgroup to select the group.

The groups can be assigned as not attached, attached as scanned or attached as selected. Assignment of the group through DGNA with attached as selected will make it the selected group of the terminal. If the group is assigned with attached as scanned, if it is not already in the currently active scan list, the terminal will add this group to a SwMI Controlled scan list and will begin monitoring downlink signalling addressed to this group. The SwMI controlled list will hold up to 10 groups, and the terminal will monitor these groups as well as groups in the user scan list.

If the talkgroup list is full when adding a new group, the assignment operation will be rejected by the terminal. If the SwMI controlled list is full and the assignment is with attached as scanned, the attachment will be rejected.

15.1.2 Removing a Talkgroup

When a dynamic group number de-assignment is received, the talkgroup will be removed from the talkgroup list in the codeplug. If the selected talkgroup is de-assigned, the terminal will show that there is no selected group.

15.1.3 DGNA Notification to the User

When DGNA operation is successful, if the terminal is provisioned for DGNA user notification, the user will be notified about the operation (for example group added, group deleted). The notification to the user will be displayed until it is confirmed by the user. In case the user receives a call, the

message will continue to be displayed until the user confirms it. (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 selected group.

15.1.4 Group Addressed DGNA

The terminal supports Group Addressed DGNA mechanisms.

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

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

The lifetime of the SuperGroup 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 supergroup.

The terminal also supports SuperGroups of scanned groups, such that a group addressed DGNA assignment received on one of the user scan group addresses, will cause the terminal to monitor all signalling addressed to that supergroup as long as the scan group is being monitored, and as long as the SuperGroup lifetime lasts.

15.1.5 DGNA Limitations

The following DGNA functionality is not supported:

- Call-related DGNA is not supported.
- The terminal does not support functionality of the “authorized user” (described in [Ref 5]).
- The terminal does not perform any network authentication before accepting DGNA.

15.1.6 Ambience Listening (AL)

Ambience Listening allows a console operator or dispatcher to monitor audio activity in the vicinity of a specific terminal without giving any indication to the affected terminal.

15.1.7 SS-AL Setup

When the terminal receives a call setup message with an invocation of Ambience Listening, the terminal will allow accept the call, open the microphone and begin transmitting, without showing any indication of the call to the user. Call acceptance and rejection while active in another call will follow the PPC rules (see Paragraph 15.2 "Pre-emptive Priority Call (PPC)").

15.1.8 Call Maintenance and Termination

The terminal will impose no time limit on the transmission (T311 will be disabled), and will continue to transmit until the SwMI ends the call or the user performs an action that causes the call to be released.

15.1.9 User Interactions

If the user attempts to start a service while the SS-AL call is in progress, the terminal will disconnect the call and initiate the service that the user has requested.

The terminal will allow the user to perform all actions that can be performed by the terminal without releasing the SS-AL call. This includes access of most menu items, changing modes, activating and deactivating scan lists and changing talkgroups. When the user changes talkgroups, the terminal will appear as if it is performing an attachment and appear that the attachment has succeeded, but the actual attachment signalling will be performed only after the SS-AL call terminates. When performing the attachment after the call, no indication will be shown to the user unless the attachment fails.

15.1.10 Pseudo Power-Down

If the user attempts to power down the terminal, the terminal will appear to power down, but remain fully operational from layer 3 and below. The terminal will show the user a blank screen, and all LEDs will be extinguished.

When the SS-AL call ends in this Pseudo power-down state, the terminal will power down.

If the user attempts to power up the radio from the Pseudo power-down state, the terminal will behave to the user as if it is really powering up.

15.2 Pre-emptive Priority Call (PPC)

If during a call, a call setup is received for a call that has a higher priority than the present call, and the call priority of the new call is "Pre-emptive Priority 3" (value 14 in the codeplug) or "Pre-emptive Priority 4 (Emergency)" (value 15 in the codeplug) the terminal will disconnect from the present call and join the new high priority call.

If the call priority of the new call is "Pre-emptive Priority 1" (value 12 in the codeplug) or "Pre-emptive Priority 2" (value 13 in the codeplug), the terminal will either accept or reject the new call, based on a provisioned setting.

When the new call is accepted, a special tone will be sounded to the user, and the user will be given an indication that this is a high priority call.

If the terminal is provisioned to be able to initiate a pre-emptive priority call, and the user initiates a private call or phone call to another party and receives a rejection with the reason 'called party busy', the terminal will provide the user with an option to initiate a new call but this time with pre-emptive priority. If the user initiates a new call it will be identical to the previous call setup, with the exception that the call priority be a high priority. The exact priority value that will be sent will be provisioned.

15.3 RF Sensitive Area Mode (Transmit Inhibit Mode TXI)

RF Sensitive Area Mode, also known as Transmit Inhibit (TXI) Mode, is a mode the terminal can enter where no radio transmissions will be sent by the terminal.

The RF SA mode is activated by the terminal user in RF sensitive areas, for example hospitals, airplanes, and so forth, where safety can be jeopardized due to terminal uplink radiation. Once in RF SA mode, the radio will not transmit under any circumstances, which means no call setup initiation, no linearization, and so forth will be possible.

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

The user enters TXI mode and exits TXI mode via a menu sequence or one-touch button.

Upon entry into or exit from TXI mode, if the terminal is camped on a cell, it will send a specially designated SDS Status message to indicate to the SwMI that it is entering or exiting TXI mode.

There will be an indication to the user when the terminal is in TXI mode.

In TXI mode the user will be prevented from initiating any non-emergency call or service, and the terminal will not send any low layer initiated transmission.

Mobility procedures that do not require the terminal to send an uplink transmission will be performed - with the exception of cell reselection which will not be performed even if no registration is required.

In TXI mode the terminal will join group calls for any group that the terminal is monitoring, but will prevent the user from transmitting on that call. The terminal will also display any incoming SDS messages to the user.

The missed call feature will be active in TXI mode to allow the user to know what calls were missed. However, 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 attempt to start the Emergency Call if the terminal is in service.

If the user powers off the terminal in TXI mode, upon power up the terminal will ask the user whether or not the user wishes to exit TXI mode. If the user answers "No" the terminal will power down.

15.4 Other Supplementary Services

15.4.1 Calling Line Identification Presentation (CLIP)

The PDUs and facility elements for this SS are not supported. However, Identification Presentation functionality is supported in most cases using the information found in the call setup messages, as specified in Paragraph 3.2.4 "Calling Party Identification Presentation", and Paragraph 4.3.4 "Calling Line Identification Presentation (CLIP)".

15.4.2 Late Entry (LE)

The PDUs and facility elements for this SS are not supported, but the functionality will be supported for Group Calls if late entry an appropriate PDUs are received. See Paragraph 2.2.8 "Late Entry".

15.4.3 Talking Party Identification (TPI)

The PDUs and facility elements for this SS are not supported. However, Identification Presentation functionality is supported in most cases using the information found in the call setup messages, as specified in Paragraph 2.2.2 "Talking Party Identification".

15.4.4 Calling Line Identification Restriction (CLIR)

CLIR is currently not supported in the terminal.

16 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 (for example 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.

17 Man Down Feature

The Man Down feature allows alerting other terminal users and the console dispatcher that something unfavorable is happening to the terminal user.

An emergency call and a status are generated after a programmable period of time that has passed since the radio entered adverse conditions.

The terminal alerts when:

- its tilt exceeds a predefined angle value.
- it remains static for a predefined period of time.

Only these Man Down settings that are enabled in the CPS may be activated or deactivated using the terminal menu or by a one touch button.

If the Man Down feature is deactivated with a one touch button, the terminal plays an audio tone once. If the feature is deactivated using the menu, the terminal does not play the tone.

The Man Down feature is based on a small sensor with low power current consumption. The sensor is interfacing directly to the terminals processor.

If any of Man Down settings is enabled the sensor performs a self test during terminal power-up. If the test fails, the terminal notifies the user with specific audio tone and status icon.

The user is also notified by specific audio tone and status icon when the MD device detects a failure during the activation of the feature.

If user deactivates the feature after the sensor failure is detected, then the icon disappears and the tone is no longer emitted.

18 MMI Features

18.1 Modeless Operation

The terminal provides access to all services from the main idle display. There is no need to select a mode before making a call.

18.1.1 Idle Display

The idle display contains:

- Icons on the top line
 - Up to 8 icons can be displayed at one time
 - The signal level and battery level icons will be displayed at all times
- Up to 5 lines of text:
 - Line 1: Network status or network identification ('No Service' or MCC/MNC or MCC/MNC alias)
 - Line 2: Selected Group Folder
 - Line 3: Selected Group
 - Lines 4,5: Home Mode Display (if available) (see Paragraph 7.5.1 "Home Mode Display")
- Softkey labels and optional menu icon on the bottom line
- An optional wallpaper background

18.1.2 Stored Number Access

The user will be able to select any target destination from the idle screen quickly and easily.

18.1.2.4 TG Scrolling

Pressing <left> or <right> or scrolling via the rotary in list scroll mode (see 18.2) on the idle display will scroll through the talkgroups to allow the user to choose a new selected group.

18.1.2.5 List Access

On the idle screen, the user will have easy access to stored target lists:

- Pressing <up> will access the favorite talkgroups list,
- Pressing <down> will access the recent calls lists
- Pressing <send> will access the last dialed numbers list

- Pressing the 'contacts' softkey will access the address book

18.2 Rotary Knob

18.2.1 Knob Physical Characteristics

The multi-function rotary knob has fixed positions where the user can feel a 'click' on each position change, but it has no barrier to stop the user from rotating the knob more than one revolution ('end-stop'). On top of the rotary is a clickable push-button.

18.2.2 Knob Operation

The rotary knob can be provisioned to operate in one of 3 ways

- Volume only
- List scroll only
- Dual mode - Volume/List scroll

In volume only operation, the rotary will be used for setting the volume level and will not be used for list scrolling.

In list scroll only operation, the rotary will be dedicated for list scrolling only and will not be used for setting the volume level. In this case, the programmable side-buttons will be used for volume control.

In dual mode operation, the rotary will be used primarily as a *volume control*, but can be temporarily put into *list scroll mode* by pressing on the rotary push-button. The rotary will remain in *list scroll mode* while the user scrolls and will then return automatically to volume control mode after being inactive for a provisioned amount of time.

A list scroll icon will appear while *list scroll mode* is active, so that the user can know which mode the rotary is in. In addition, when the rotary returns automatically to *volume control*, a tone will be heard.

18.2.3 Blind TG Operation ('End-Stop' Simulation)

The rotary can be provisioned to operate with non-continuous scrolling for blind Talkgroup selection as described in section 2.1.5 "TG Blind Operation" on page 2-8.

18.2.4 Rotary Lock

If the terminal is provisioned for Rotary Lock, a long press on the rotary push button will cause rotation of the knob to have no effect on volume or list scrolling. This purpose of this feature is to prevent accidental rotation of the knob. When the rotary is locked, a subsequent long press on the rotary button will unlock the rotary.

18.2.5 TG Select Confirm

When using the rotary to scroll through groups, normally the group is automatically selected after the knob is inactive for a number of seconds. However, the terminal can be provisioned to only select the group after the user explicitly confirms the selection.

18.3 Speaker / Earpiece

The terminal has two separate microphones. One located at the top of the unit for dispatch (semi-duplex) operation, and the second located on the bottom of the unit for full duplex calls.

The terminal provides a special proprietary feature that allows the user that is using the speaker phone to interrupt the talking party.

The terminal has a dedicated key for the user to listen to semi-duplex (group and private) calls via the earpiece and to switch between earpiece and speaker.

18.4 Display Features

18.4.1 Colours

The terminal utilizes colours to highlight certain special situations:

- When the battery is low
- When signal strength is low
- When the terminal is in an Emergency Mode/Call
- When terminal is camped on a cell that is in LST

18.4.2 Display Flip

If this option is provisioned, the terminal provides the user with the ability to reverse the direction of the display, so that the display can be read when holding the terminal upside down. This is sometimes useful for users that wear the terminal on their belt.

18.4.3 Fonts

The terminal has two enlarged 'zoom' font that the user is able to choose via the menu.

18.4.4 Backlight

The backlight can be provisioned to operate in one of the following modes:

- Disabled: The backlight does not operate at all.
- Manual: Pressing a provisioned one-touch button will toggle the on/off state of the backlight. The backlight is never automatically turned on or off.
- Semi-Auto: Pressing a provisioned one-touch button will toggle the on/off state of the backlight. The backlight is also turned off automatically when the backlight timer runs out.
- Auto: Pressing any key will automatically turn the backlight on. The backlight will remain on until the backlight timer runs out, or if a provisioned one-touch button is pressed to turn it off

The user can also toggle between 'disabled' and 'auto' via the menu

18.4.5 Screen Saver

The terminal supports a provisioned option to display a "screen saver" when the terminal has been idle for a provisioned period of time, or when the user explicitly activates it.

The screen saver consists of an image, which can be provisioned from any "gif" image, and a text string which can also be provisioned.

When the screen saver is being displayed, any key input by the user or incoming service will cause the screen saver to be deactivated.

18.5 Covert Mode

The Covert Mode feature is designed to give to the user ability to completely shut down all visible and audible alerts and notifications effectively making the radio unnoticeable even in a silent and dark environment.

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 Disabled (corresponding to Backlight menu entry)
- switches off the LED indicator

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.

18.6 Configurable Menu Tree

The Configurable Menu Tree feature allows the user to define which menu entries shall be visible in the terminal menu when in operation to ensure easy access to critical or needed features.

The CPS displays the radio menu tree with a checkbox for each item. The menu item is visible in the terminal menu if the respective checkbox is enabled in the CPS as described in section 23.4 "Menu Configuration" on page 2-98.

18.7 Keypad Lock

The user is able to lock the keypad to prevent accidental pressing of keys. The keypad Lock and Unlock can be invoked via the menu or via a predefined menu shortcut (<Menu>,<Left>).

While the keypad is locked, all front and side keys (including PTT) are inoperative with the exception of the <Power off> and Emergency buttons.

When an incoming call is received, the <Send> and PTT buttons will automatically be unlocked until the call ends.

18.8 Languages

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

- English
- German
- French
- Spanish
- Dutch
- Greek
- Italian
- Swedish
- Norwegian
- Lithuanian

- Hungarian
- Arabic
- Russian
- Chinese (simplified)
- Chinese (traditional)
- Korean
- User Defined Language *)

*) In addition to these languages, the terminal provides an option to use a "Local Language" where each text string used by the terminal is defined in the codeplug.

18.9 Unified Address Book (Contacts)

The terminal offers an address book facility, where multiple numbers are associated with a single name tag; This presents a PDA-like interface to the address book and provides a natural way to call an individual who can be contacted in different ways. Each individual can have up to 6 associated numbers:

- Private (a TETRA ISSI)
- Home (phone number)
- Mobile (phone number)
- Work (phone number)
- PABX (local short number)
- Other (phone number)

The terminal provides editing capabilities to the address book to allow the user to add or delete entries.

The Contact List has a maximum capacity of 1000 Contacts, each with a private number (SSI), and up to 1000 associated Phone or PABX numbers distributed amongst the contacts (for example: 1 number for each 1000 contacts, or 5 numbers for 200 contacts and so forth).

The terminal provides the user with the ability to view the number of used and free address book entries.

18.10 Dialing Methods

The terminal supports multiple methods for selecting a number for an outgoing call.

18.10.1 Scroll Method

Scrolling keys are used to scroll back and forth through the contact list or talkgroup/folder names.

If the rotary is provisioned for list scrolling, the user will be able to scroll through the currently focused list using the rotary.

18.10.2 One-Touch Button Method

If one-touch button method is provisioned, the user can call an individual by pressing and holding down one of the programmable buttons, as described in Paragraph 18.14 "One Touch Keys".

18.10.3 Call History Re-dial

The user can re-dial numbers from the Call History Stack (see Paragraph 18.11 "Call History").

18.11 Call History

A Call History stack is provided which consists of the following:

- Last dialled numbers;
- Missed call numbers;
- Answered ("Received") call numbers.

The Call History stack holds private TETRA IDs as well as phone and PABX numbers.

Numbers from the stack may be viewed, selected and called.

When the user scrolls through the lists the entries will appear to the user in the opposite order from which they were received (most recent shown first). When a call is made/received to/from a number that already exists in the 'last dialed'/'received' lists, that number will not be duplicated in the list, but it will be moved to the beginning of the list. However, 'missed call' entries will be duplicated in the 'missed calls' list.

The call history lists are stored in the terminal's non-volatile memory and will be available to the user after next power up.

The user is provided with the ability to save a number in the call history stack to the address book.

When a call is received and is unanswered, the user will be shown that a call was missed.

18.12 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 (for example 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.

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

The terminal display supports:

- Twenty-four-hour and twelve-hour formats
- 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.

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

18.13 Audio Features

18.13.1 Feature Overview

There are many situations where the demand of audio quality changes according to the working environment. For example, an airport worker, who works partly in the field where there is lots of noise coming from the surrounding environment and partly inside the airport where there is relatively less noise, may experience different audio quality. In the working environments like this, there is a need of different audio quality and subsequently adaptive audio parameters which can be configured according to the working environment.

When accessing the Main Menu and selecting Set Up, the "Audio" mode will show the following three fields: <Audio Profiles>, <Howling Supr> and <Audio Toggle>.

By selecting Audio Profiles, the user will have a choice to select an audio profile among the available ones.

18.13.2 Audio Profiles

An audio profile is a profile that adjusts the audio parameters of the terminal so that it can be changed to fit its current operating environment. The following parameters can be changed in an audio profile according to a particular working environment:

- Receive and transmit gains
- Receive and transmit EQ filters
- AGC, Echo Canceller and RX/TX Noise suppressor
- Tone volume

The Audio Profiles are created from the templates provided by Motorola. These templates can not be changed by customers.

The customer has the ability to create several profiles based on one template. Several audio profiles can be created based on the same template to serve the different purposes. The number of Audio templates available to the Customer CPS can be configured in the Depot/LAB CPS.

18.13.2.6 Templates and Profiles

There is a clear distinction between an audio template and an audio profile. Audio templates are provided by Motorola with each template have a range of default values which customers can not change. The customer/user can use the audio template in order to create audio profiles for his/her own use.

18.13.2.7 Templates Provided by Motorola

The templates enable users to select the appropriate audio configuration for meeting the transmission level plan of the TETRA standard and achieving suppression of acoustic feedback (howling). The configuration to use is determined by the average C-weighted sound pressure of the background noise.

A profile should be created for each of the environments in which the radio will be used, for example: one profile created with the "Indoor" template for indoor use and another one created with: "Outdoor Noisy, type2" template for outdoor use.

To achieve the best possible audio performance when users change their operational environment (for example: leaving an indoor environment and entering a noisy outdoor environment), users should select an appropriate profile for the new environment using the radio menu.

Descriptions of the audio templates provided by the Motorola are as follows:

- **General Purpose**
This audio template should be chosen when the radio is used in a moderate ambient noise environment where the sound pressure level is less than 79 dBSPL(C).
Example: The day to day indoor and moderate noisy outdoor environment.
- **Indoor**
This audio template should be chosen when the radio is used in the quiet indoor environment where the ambient sound pressure level is less than 65 dBSPL(C).
Example: A business office environment.
- **Outdoor, Noisy type1**
This audio template should be chosen when the radio is used in a noisy street environment where the ambient sound pressure level is around 85 dBSPL(C).
Example: Traffic noise environment
- **Outdoor, Noisy type2**
This audio template may be chosen when the radio is used in a low frequency background noise environment where sound pressure level is around 85 dBSPL(C). This template is optimized with respect to speech intelligibility.
Example: Port, airport, energy plant etc. environments
- **Outdoor, Noisy type3**
This audio template may be chosen when the radio is used in a low frequency background noise environment where sound pressure level is around 85 dBSPL(C). This template is optimized with respect to noise penetration.
Example: as Noisy type 2
- **Outdoor, Harsh type1**
This audio template should be chosen when the radio is used in a harsh noise environment where sound pressure level is around 89 dBSPL(C). This template provides a compromise between loudness and howling distance.
Example: as Noisy type 2
- **Outdoor, Harsh type2**
This audio template should be chosen when the radio is used in a harsh noise environment where sound pressure level is around 89 dBSPL(C). This template is optimized with respect to loudness at an expense of howling distance.
Example: as Noisy type 2

Note: Several Audio Profiles can be created based on the same template to cater to different use cases for example:

- Outdoor, handheld
- Outdoor, shoulder worn

18.13.2.8 Names of the Audio Templates

The names of the audio templates are as follows and they are only visible in CPS:

- General purpose
- Indoor
- Outdoor, Noisy type1
- Outdoor, Noisy type2
- Outdoor, Noisy type3
- Outdoor, Harsh type1
- Outdoor, Harsh type2

18.13.2.9 Names of the Customer Specific Templates

The names of the customer specific templates are as follows and are only visible in CPS:

- Yan Tian
- SMP
- HIT

18.13.2.10 Enabling Customer Specific Templates

In addition to the default enabled five Motorola templates, the names of the customer specific templates are only visible in CPS and can only be used as a template when creating Audio Profiles.

18.13.2.11 Maximum Number of Customer Specific Templates

There can only be one “customer specific” template enabled at a time. The CPS user can create a maximum of five audio profiles.

18.13.2.12 Creating an Audio Profile Based on the Template

The CPS user has the ability to create an audio profile from one of the five available templates provided by Motorola. If the customer-specific template is enabled, then the available templates are six.

18.13.2.13 Enabling/Disabling an Audio Profile

The CPS user has the ability to enable/disable an audio profile in the CPS.

18.13.2.14 Assigning the Aliases to Audio Profile

The CPS user gives an alias/name to a particular profile configured in the CPS.

18.13.2.15 Maintaining Independent Audio Profiles

The audio profiles are created and maintained independent of each other. Creating or modifying one audio profile does not have any impact on the others.

18.13.2.16 Switching From One Audio Profile to Another

The terminal provides the user the ability to switch from one audio profile to another through the menu. Once the terminal user has selected an audio profile, all the audio parameters of previous profile shall be overwritten by that of the current one.

18.13.2.17 Modifying an Audio Profile

The CPS user has the ability to modify an audio profile by changing some of the audio parameters in CPS.

18.13.2.18 Modifying the Audio Parameters of an Audio Profile

The CPS user shall have the ability to change the following audio parameter in order to modify an audio profile in the CPS.

- AGC
- Echo Cancellor
- Noise Suppressor
- Ambience Listening
- Alert Tone Volume

- Ring tone volume
- Key Clicks tone volume
- DTMF tone volume
- Gain reduction for mic (for howling suppression)
- Gain reduction for speaker (for howling suppression)

Note: An Audio Template will be under control of Motorola and cannot be modified. If a customer chooses to modify an Audio Profile (that is using other than Template defined values) it is as his own responsibility and will not be supported by Motorola. However, some parameters, though, will be allowed to be modified. CPS users shall have the ability to create more than one audio profile from a single template. A “editable” check box has been implemented in CPS that grays out all parameters except those that the customer is allowed to change. Checking / un-checking this shall give a warning/disclaimer. If the terminal user changes the non-allowable audio parameters, Motorola bears no responsibility for the malfunctioning of this profile / feature.

18.13.2.19 Audio Profile on Power Up

Once the terminal has been switched OFF, it remembers the last selected audio profile upon switching ON again.

18.13.2.20 Selecting an Audio Profile

The terminal provides the user the ability to select an audio profile from the Audio Profiles section of the menu.

18.13.2.21 Using Default Audio Parameters in an Audio Profile

An “Editable” check box is implemented in the CPS. By default, it remains unchecked, that gray's out some of the audio parameters which means the customers are not allowed to modify them. Checking this “Editable” box shall unlock the locked audio parameters and opens them up for the customer to modify.

18.13.3 Howling Suppression

“Howling Suppression” is a mode of operation that increases the stability of the acoustic feed back loop from receiving radios to the sending radio in simplex calls so as to avoid howling. The terminal eliminates howling and this may (even preferable) be done either by the menu or via an OTB to temporarily enable a special anti-howling function.

18.13.3.22 Howling Suppression Enabled/Disabled

When the howling suppression is enabled, a profile dependant transmit and receive gain offsets is used to minimise the loop gain. Upon power-up, suppression of howling is disabled.

18.13.3.23 Service and Feature Interaction

If the users are in an active call, then they can change the audio profile.

18.13.3.24 Howling Suppression During an Active Call

If the users are in an active call, then they have the ability to enable/disable the howling suppression.

18.13.3.25 Audio Toggle

The “Audio” category is available in the “Set-Up” sub-menu. The “Audio” setting shows the following three fields: <Audio Profiles>, <Howling Supr> and <Audio Toggle>.

The two options for <Audio Toggle> are “Always Loud” and “Speaker Cntrl”.

18.14 One Touch Keys

It is possible to provision the 2 side programmable buttons to initiate one of the following operations when the button is pressed for an extended time. The programming is provisioned in the terminal and is not changeable by the end-user. The functions that are programmable to these buttons are:

- Man Down Enable/Disable
- Text zoom toggle
- Backlight On/off toggle
- TG Scan toggle (Turns on and off talkgroup scanning)
- DMO/TMO toggle (Changes to DMO or TMO mode)
- Enter/Exit TXI Mode
- Send a SDS Status message to a preprogrammed address
- Send an SDS text message to a designated ID
- Start a call to a designated Private ID, Phone number or PABX number
- Select a designated talkgroup
- Audio Profiles
- Howling Suppression
- High/Low audio toggle
- Flip the display
- Screen saver activation

18.15 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 the Test Mode: “Left Arrow, Right Arrow, Left Arrow, Menu”.

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:

18.15.1 Version Information

Displays software/hardware version information:

- Build Date
- CodePlug version
- DSP Software version

- Host Software version
- Hardware ID
- Equip ID
- LLS version

18.15.2 Addresses

Displays the following:

- Home MNI
- Group ID
- Own ISSI
- ASSI

18.15.3 Error Logs

Displays information about software errors:

- Error log
- Fatal
- Reset

18.15.4 Cell Information

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

18.15.5 Cell Lists

Displays frequency lists:

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

18.15.6 Data Services

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

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

Note: The terminal software was changed for MR8.6 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.

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

18.15.7 Key Information

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

- For Serving Cell:
 - Security class of the serving cell, that is 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, that is SCKN and SCK-VN attributes
 - List all SCKs stored in the MS, that is SCKN and SCK-VN attributes
- For GCK:
 - Current Full GCK-VN
 - List all GCKs stored in the MS, that is GCKN and GCK-VN attributes

18.15.8 Memory (if Enabled in Codeplug)

Contains the following options:

- Host Memory
- DSP P-Memory
- DSP X-Memory
- DSP Y-Memory

19 Tool Interface Support

The terminal supports interfaces with external diagnostic and testing software.

19.1 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.

19.2 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 18.15 "Test Page / Test Mode".

Chapter 3

CUSTOMER PROGRAMMING SOFTWARE (CPS)

1 Introduction

The TETRA CPS (part no GMVN5487) 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.

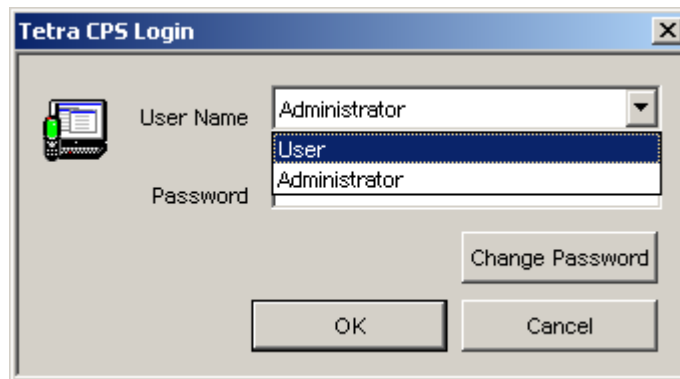
If there is an earlier version of CPS, it may be over written.

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 menu options are available.

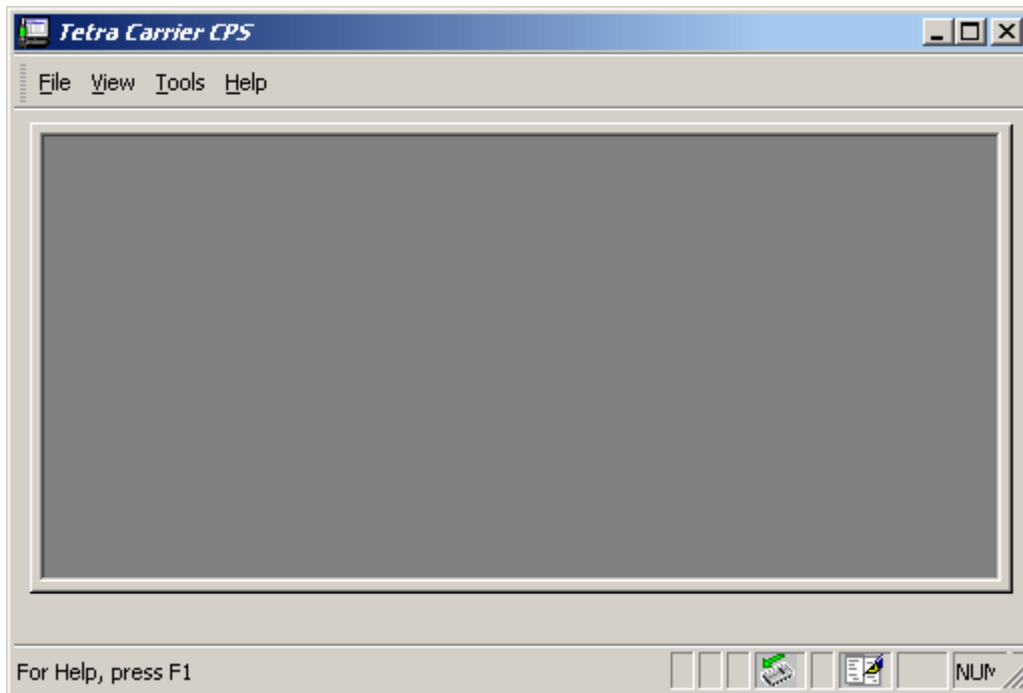
It is possible to change both passwords using the Change Password option before logging in

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



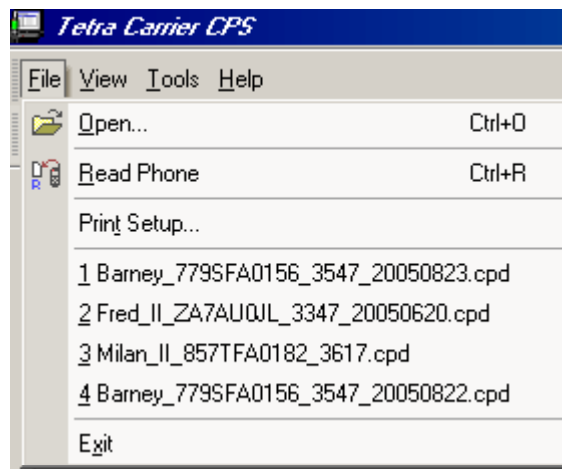
This window shows the title bar with the minimise, restore and close icons at the top. Below this is the File, View, Tools and Help bar, each of which when selected will open to display option menus.

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

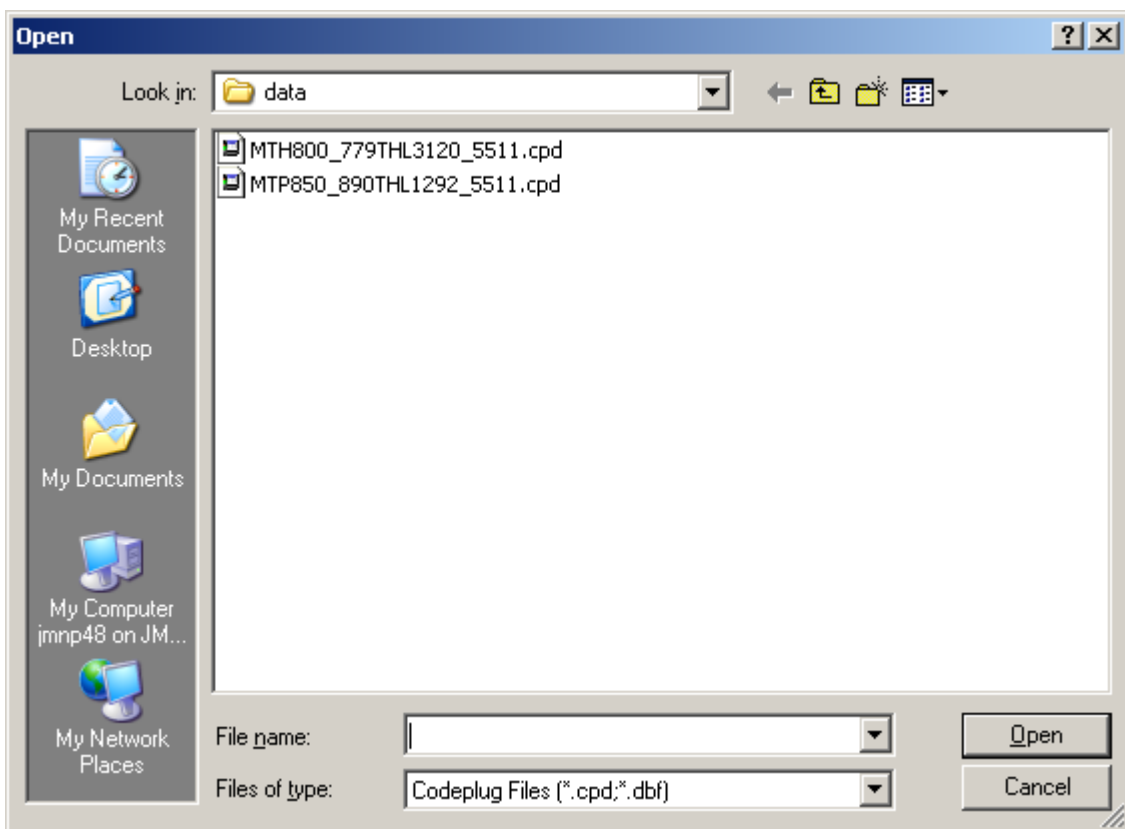


There are 2 sub menus associated with the File Menu. The first is shown above and is displayed when no terminal codeplug has been read, or loaded from archive. The options are:

3.2.1 Open

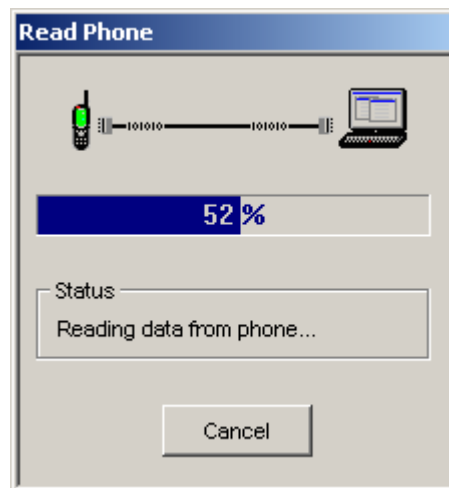
This option allows the user to select a previously archived codeplug.

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.

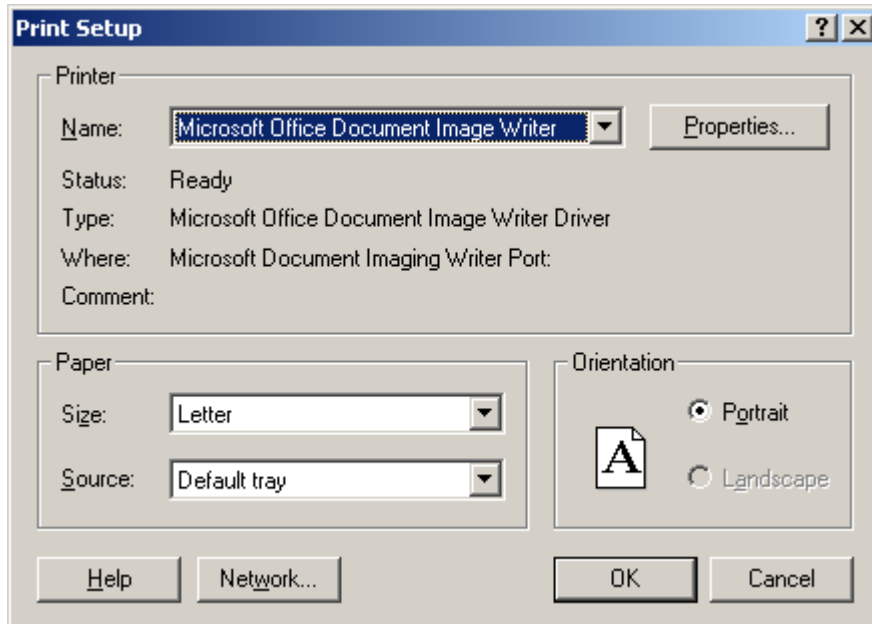


During this process the CPS will establish communications with the terminal (Initializing), verify the codeplug is compatible with this version of CPS (an older version of CPS will not read a newer version of the codeplug) and read it for display in the CPS window work area.

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.

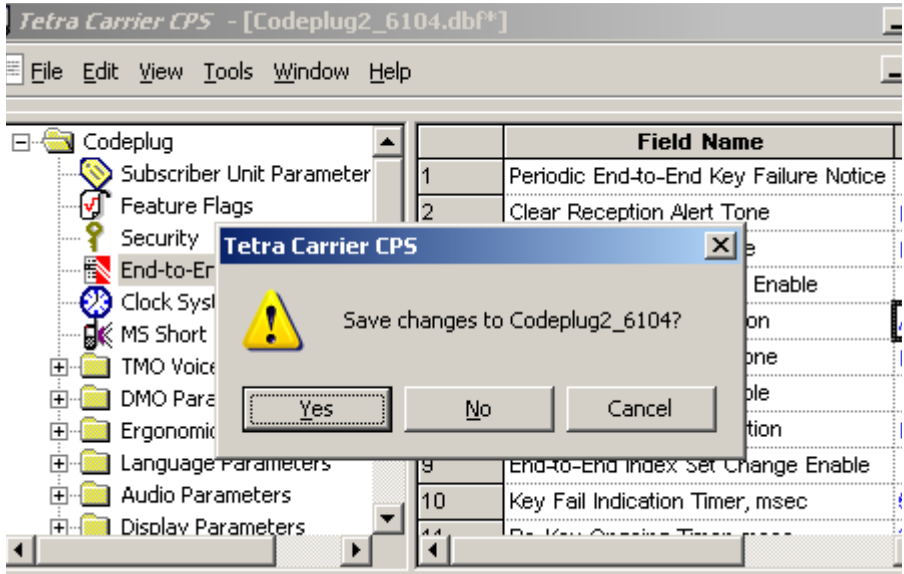
3.2.3 Print Setup

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

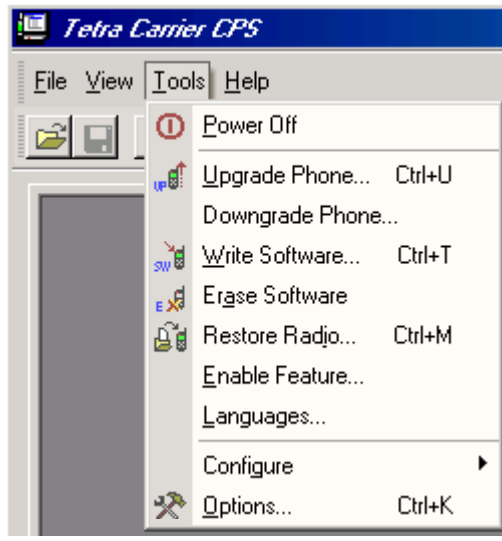


3.2.4 Exit

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.

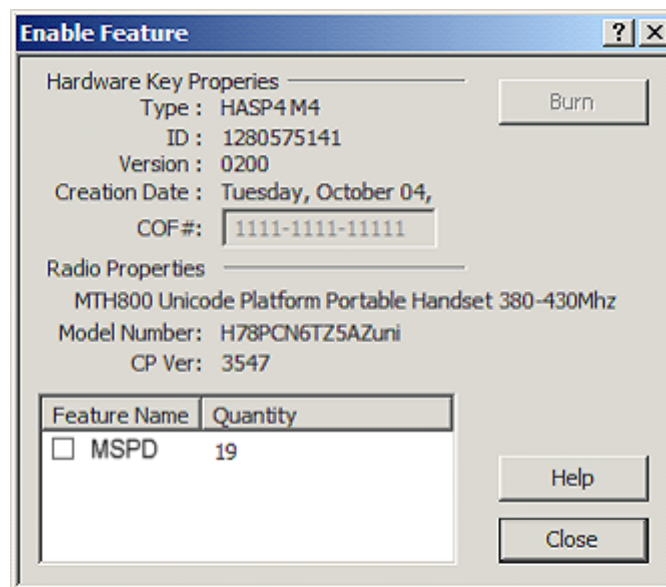
Some TETRA features (MSPD for MTH800) are separately priced in terminals from release MR5.3 on, apart from MSPD from MR5.4 on. The customer who has paid either for a single feature or for a

number of features receives the Feature Enable kit, that is 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.

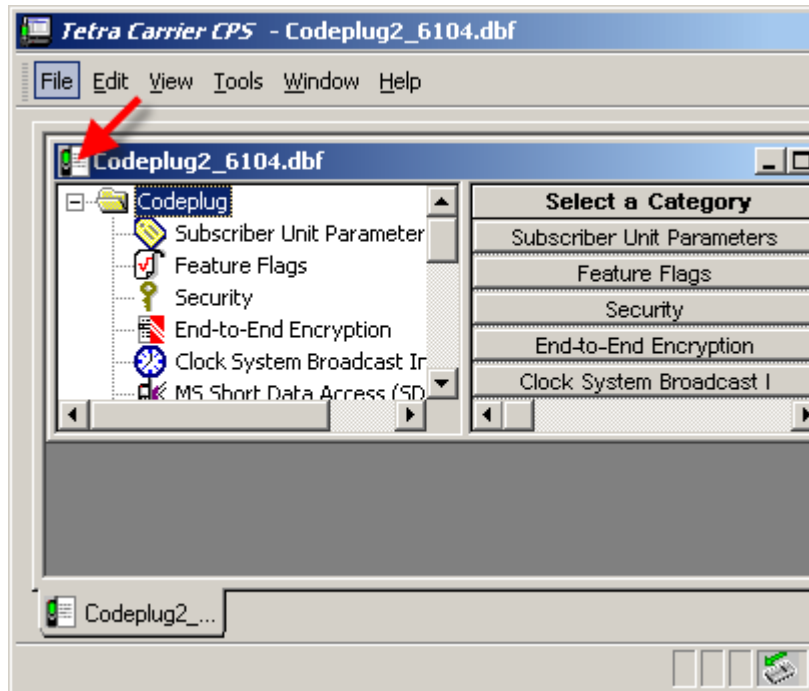


6. Enable the check box next to the feature you have paid.
7. Click Burn. Each counter will be decreased each time you enable one of the features you have ordered.
8. The CPS scans communication ports and detects the terminal that is connected to the port. The Operation Results message appears and displays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

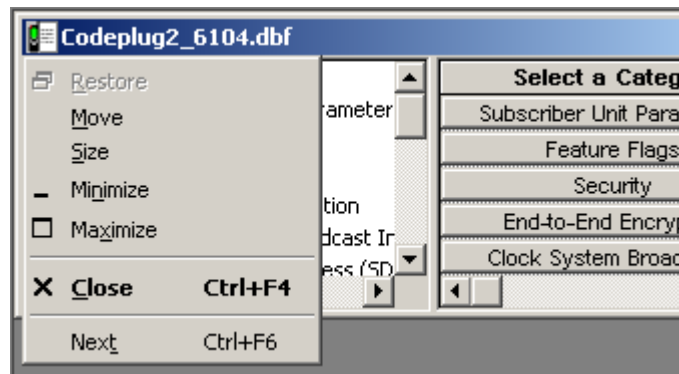
Note: If all paid features are enabled in a dongle and several terminals are connected for simultaneous feature enabling. Some features may not have been paid for some of the terminals or may already have been enabled. The Customer CPS will automatically detect which features were paid or enabled for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

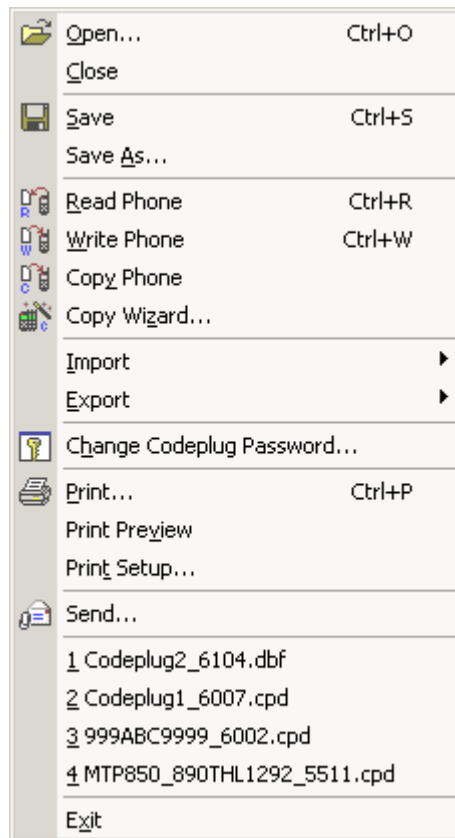


The Restore, Move, Size Minimise and Maximise options are used to position or alter the size of the viewed code plug screen. In other words if the screen has been maximised, selecting restore will return it to the size it was when first opened.

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.

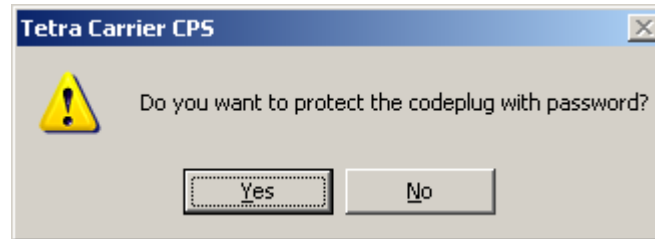
1. In the File Open dialogue box, navigate to the drive and folder (or directory) where the codeplug file is located.
2. Then double-click the desired file name, or highlight the file name and click OK to complete the task. The codeplug contents will then be displayed in the CPS.
3. If the codeplug file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

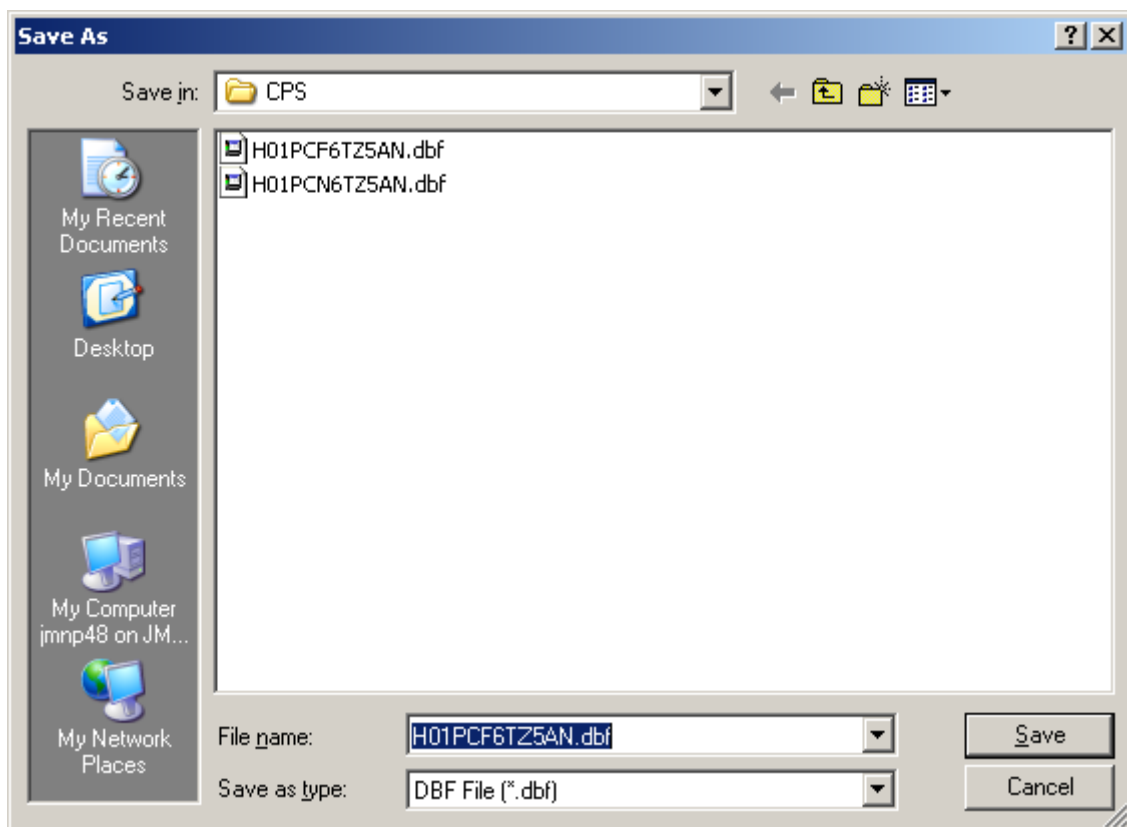
4.3 Save

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, that is 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

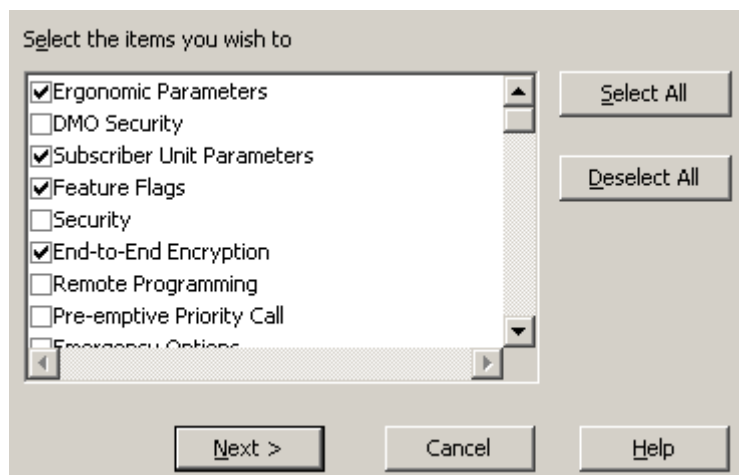
This option will copy the displayed codeplug to a connected terminal of the same model.

4.8 Copy Wizard

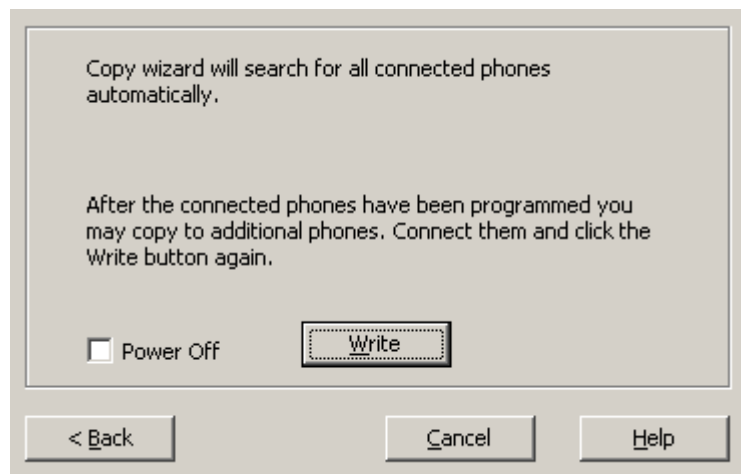
This is a 2 step feature that enables cloning of codeplug data from a master codeplug to one or more terminals of the same model.

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 - that is 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.



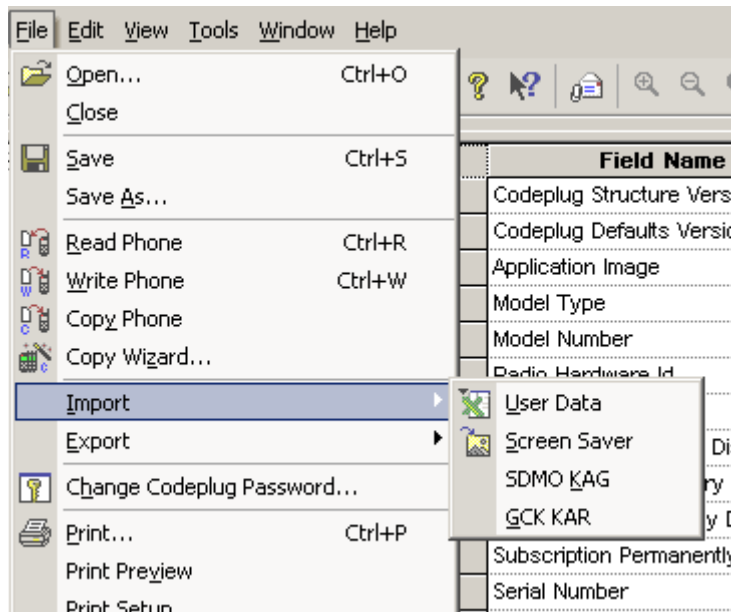
CAUTION: Never disconnect the programming cable from the terminal during the programming process, or power off the PC while the codeplug file is in memory. This will cause codeplug data to be corrupted.

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.

4.9.2 Screen Saver

This option is used to import screen saver from a graphic file format to the radio.

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.

Note:

- 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 used to save the screen saver to the hard disk for use in another single radio or for further graphic processing.

Proceed as follows:

1. Read master codeplug from master phone, or open master codeplug file.
2. Select File/ Export/ Screen Saver. The Save As dialogue box will appear. You can save the graphic file with the current name displayed, or you can type a new name in the file name field and save the file under this name. In addition, you can select the place of the file on the hard disk. Click Save to confirm your choice.
3. The CPS displays an appropriate message to let you know whether or not the export operation was successful.

4.11 Change Codeplug Password

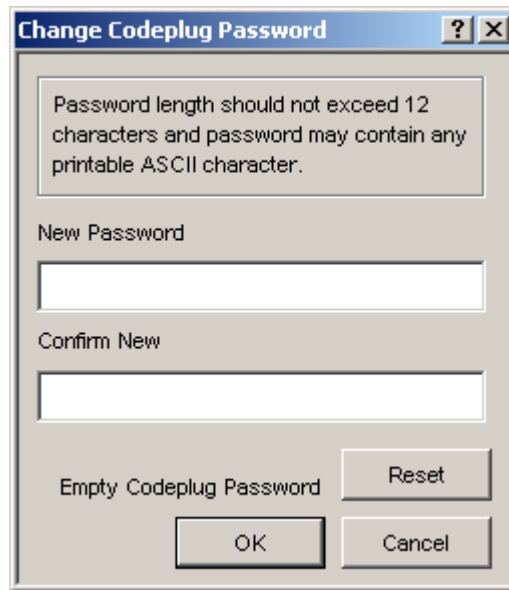
If the codeplug is protected by a password, this menu enables the codeplug password to be changed.

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.



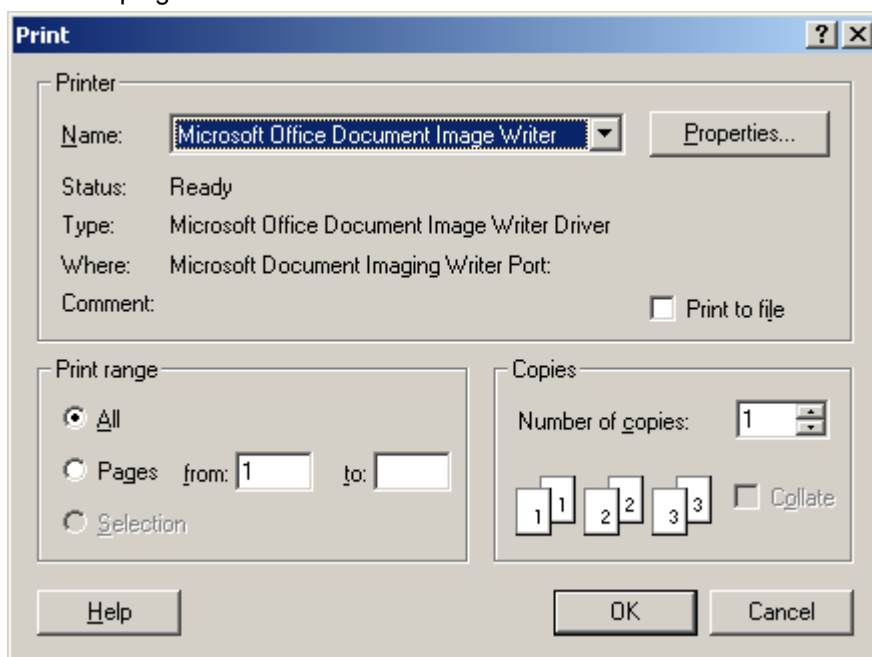
Follow the same procedure to change a password.

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.



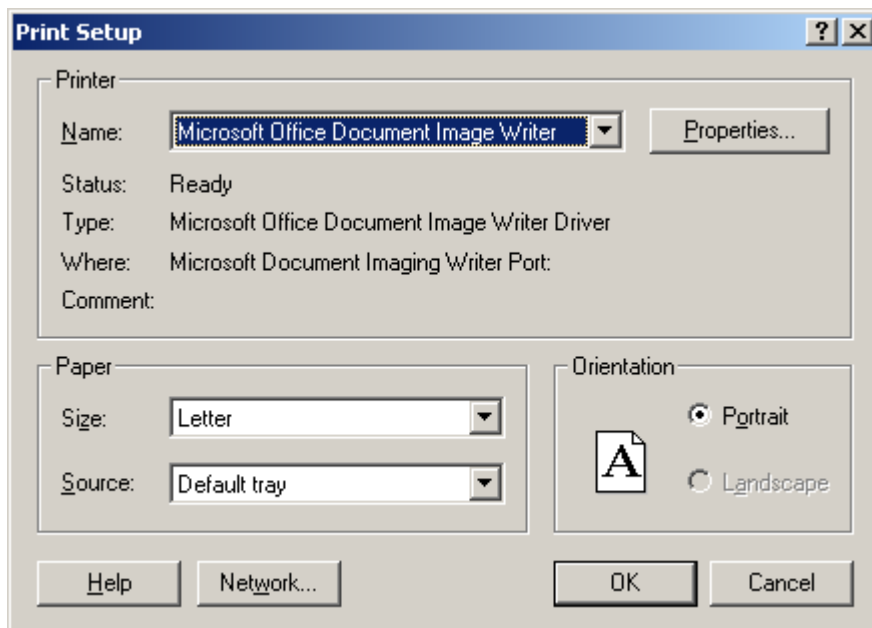
4.13 Print Preview

	Field Name	Field Value	Reset
1	Codeplug Structure Version	0x0047	
2	Codeplug Defaults Version	0x0013	
3	Application Image		
4	Model Type	MTP850 380-430MHz L/KP ATEX PT911BEx	
5	Model Number	H01PCF6TZ5AN	
6	Radio Hardware Id	Expand	
7	Copyright Notice	Copyright (c) 1995-2008, Motorola Inc.	
8	Equipment Temporary Disabled	<input type="checkbox"/>	
9	Subscription Temporary Disabled	<input type="checkbox"/>	
10	Equipment Permanently Disabled	<input type="checkbox"/>	

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.

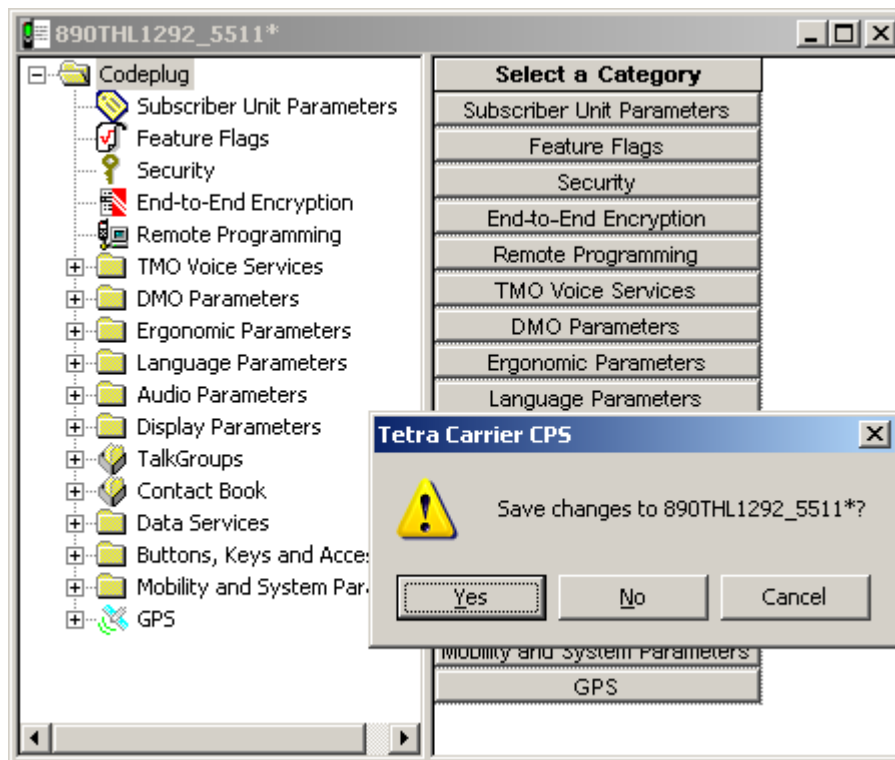
The standard Microsoft Outlook® message screen will appear. The message title and the Subject field will display the name of the Codeplug file from the active window. The Codeplug file itself will be attached to the message. Type the name of the message recipient in the 'To Field' and press the Send 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.

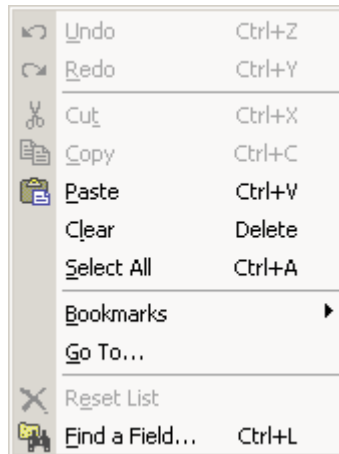
4.16 Exit

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.

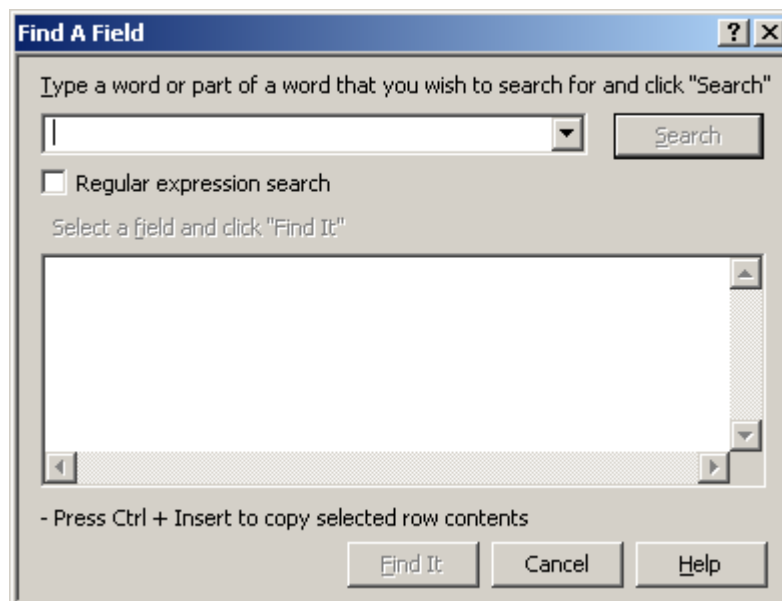


The available sub menu options are self explanatory and most will remain 'greyed out' until a codeplug has been opened and a sub menu or an option of a sub menu has been opened.

5.1 Find A Field

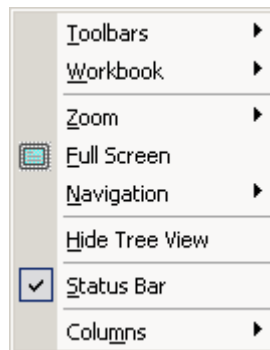
This option is used to find a field in the application.

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.

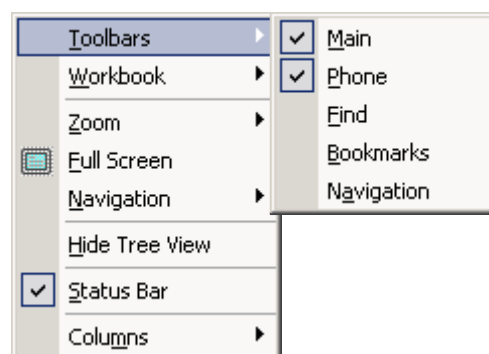


The available sub menus are:

- 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

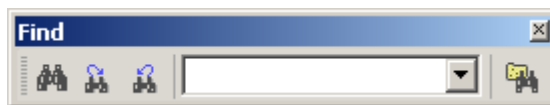
This is used to toggle the Main toolbar display on or off. This toolbar provides easy access, by icon selection, to standard functions such as save file, open file, print file, cut, copy, and paste.

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

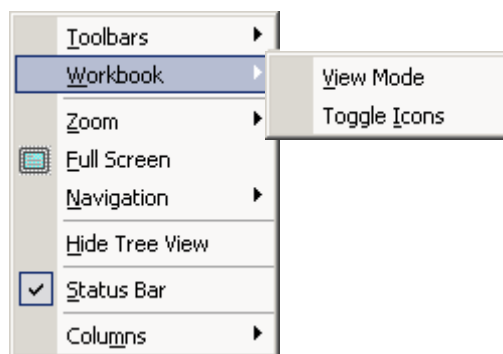
This is used to display the Book Mark icon options on the tool bar.

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

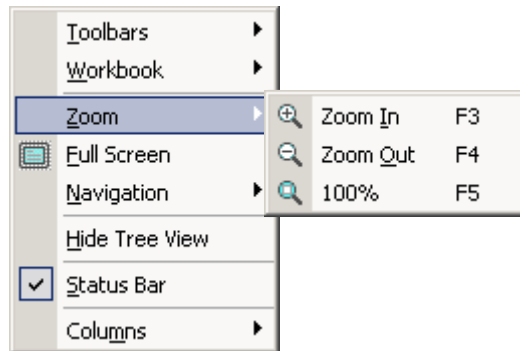
6.2.1 View Mode

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

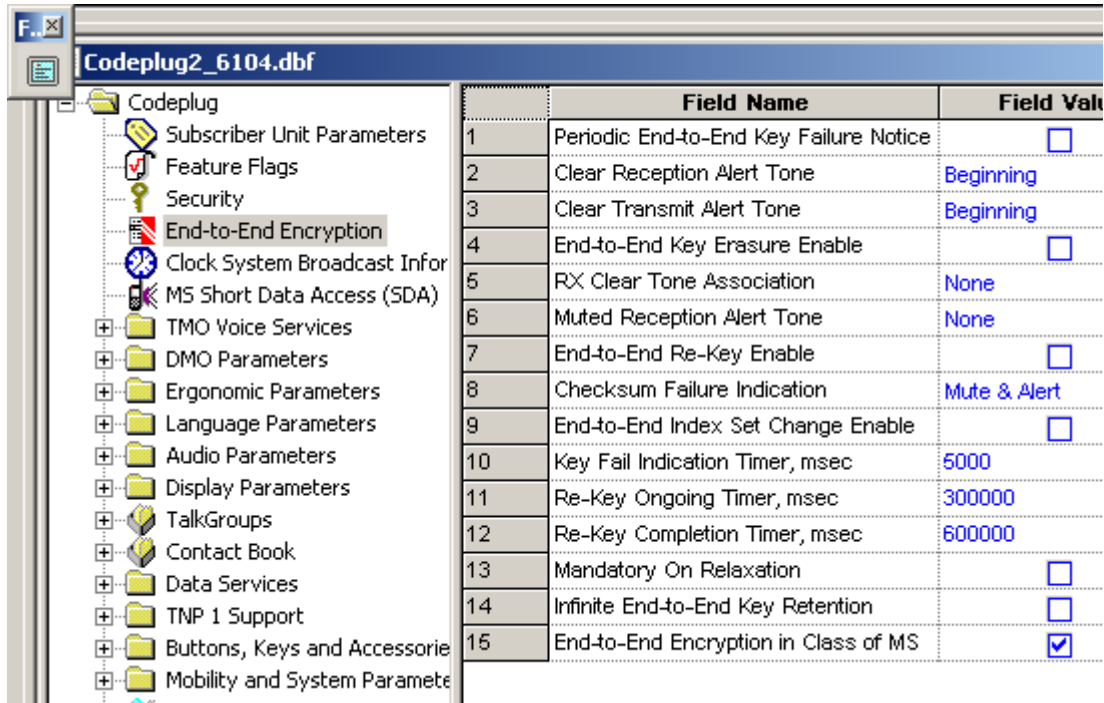


It is possible to change the magnification level of a codeplug file page and the minimum and maximum zoom levels depend on the open page size.

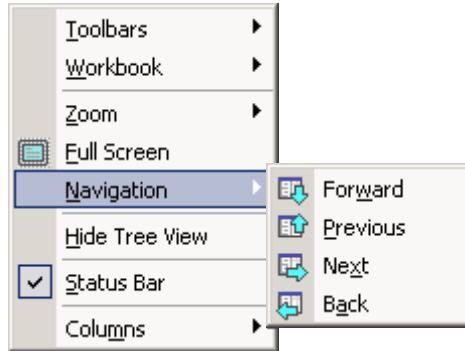
Choosing the 100% option will make the codeplug file fill the work screen

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

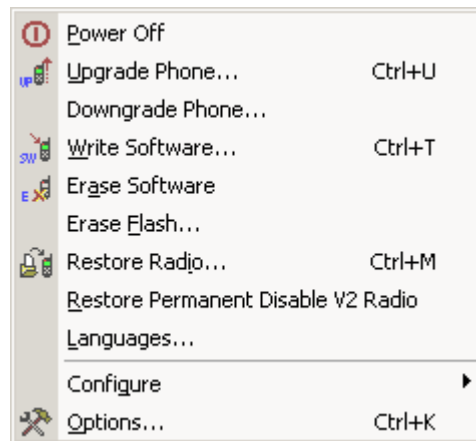
This option is used to toggle the tree view on or off.

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.

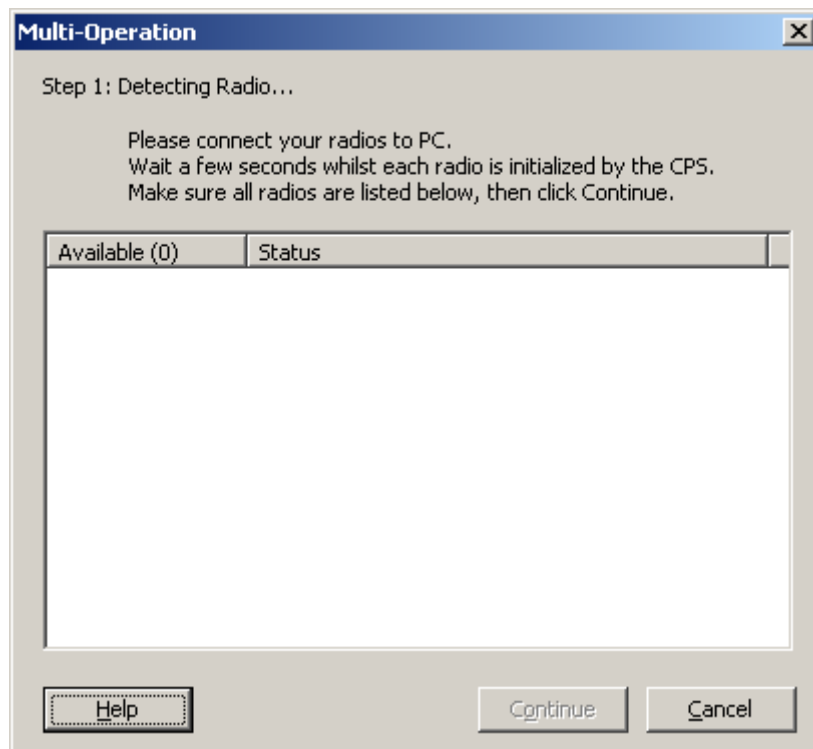
The Power Off option is recommended when programming as the terminal will be restored to normal operation without having to remove the battery.

7.2 Upgrade Phone

This option is used to upgrade one, or several terminals simultaneously (up to 16 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.



After connecting the radios CPS needs some time to detect them. Wait until all the radios are detected and listed before clicking **Continue**. Otherwise the upgrading process is not performed correctly.

When a radio cannot be detected, check if the hardware is set up properly.

After the connection is established CPS reads the radios information, lists their status and determines whether there is an update available.

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.

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"

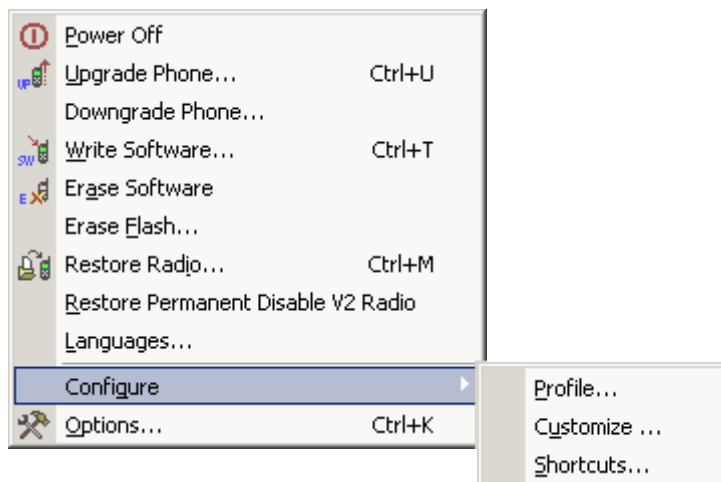
One of 4 options can be selected:

- European, Greek
- European, Arabic
- Chinese
- Korean

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.

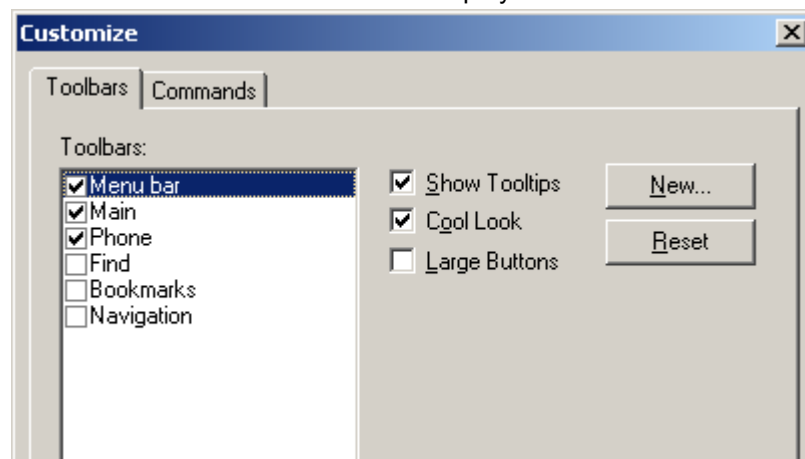
7.8.2 Customize

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:

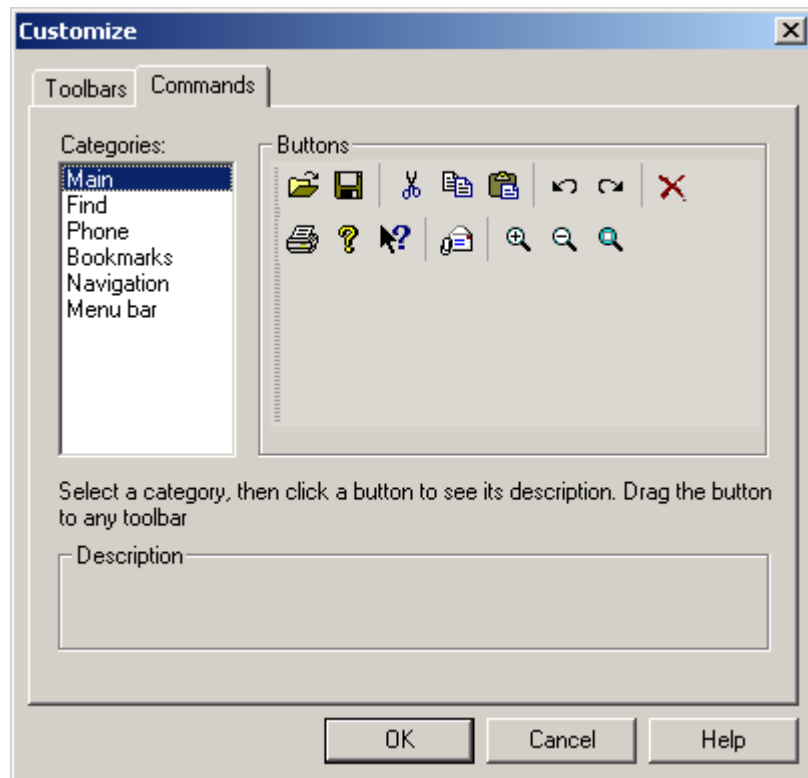
7.8.2.1 Toolbars

This sets the viewed Icons and Tool Bars for display.



7.8.2.2 Commands

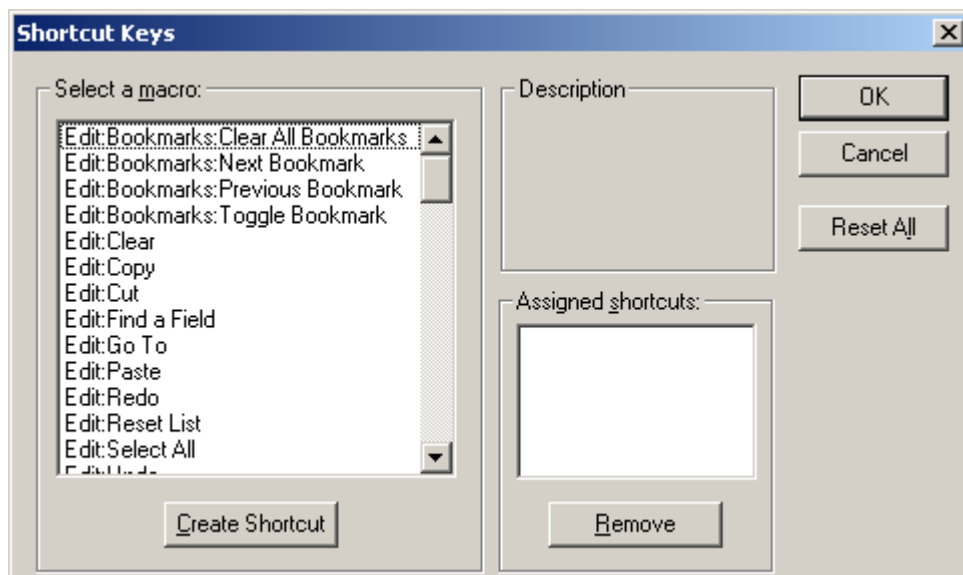
Choose a category to show its available buttons, select the required button and drag it onto a toolbar.



7.8.3 Short Cut

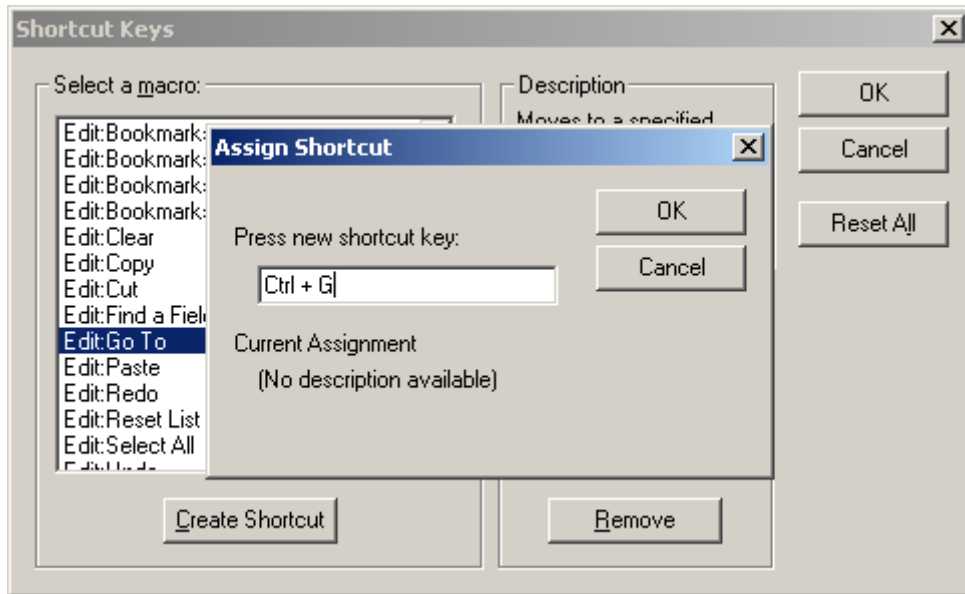
This option is used to create computer keypad short cuts for the CPS.

For example: 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.



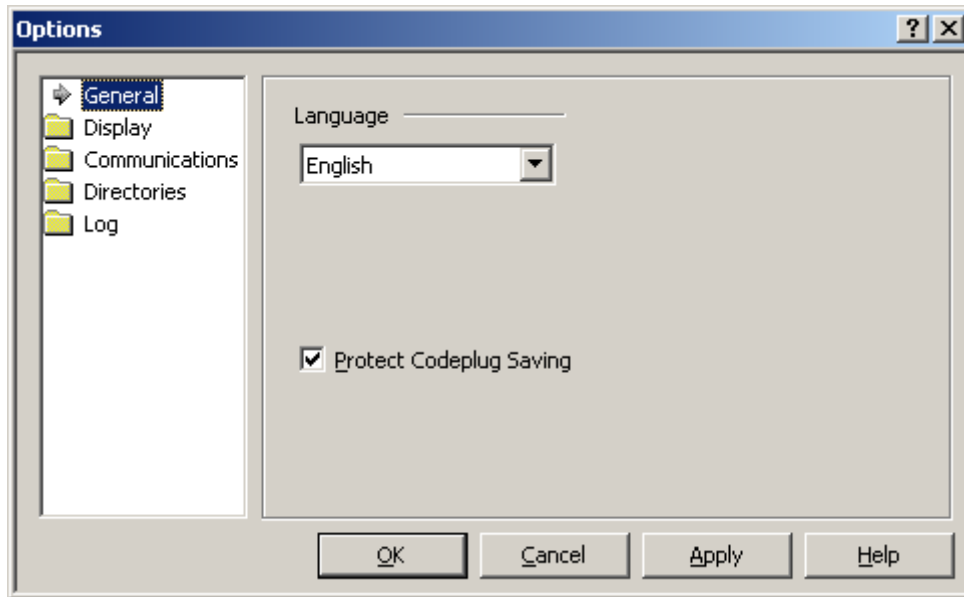
7.8.4 Options

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

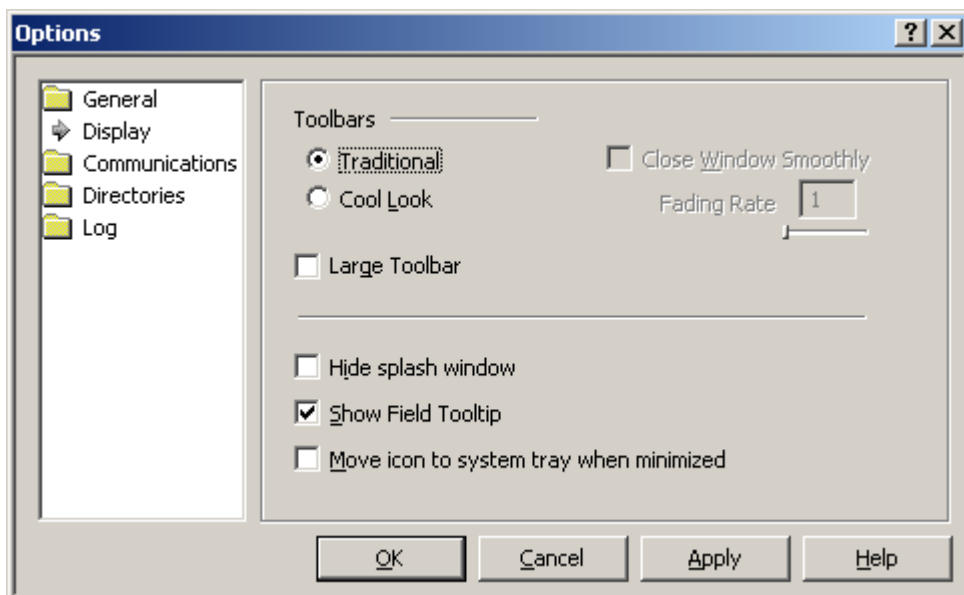
7.8.4.1 General



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

7.8.4.2 Display



These options allow:

1. Switching between “Cool” interface and “Traditional” interface as well as offering some addi-

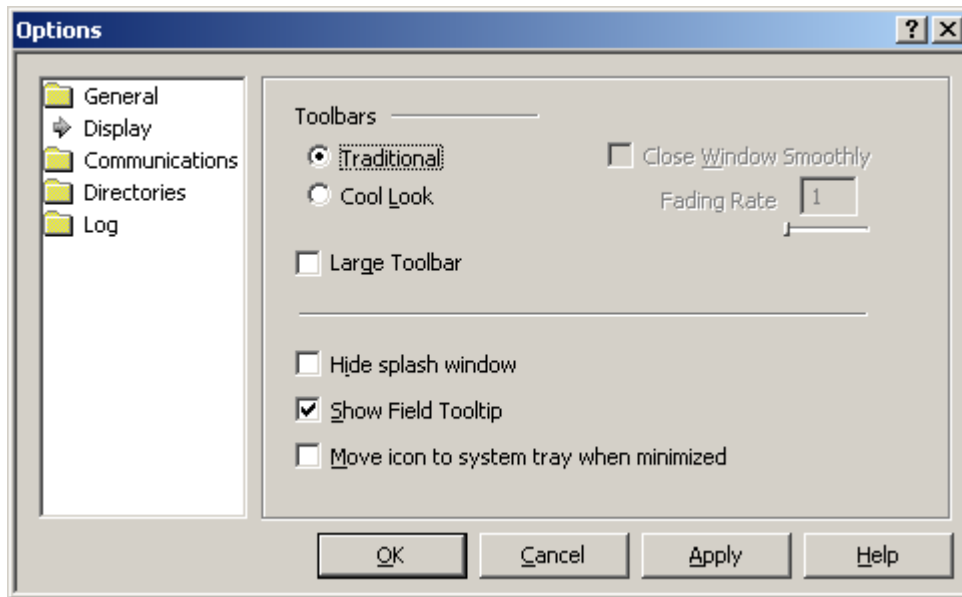
tional options for each one:

- 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.

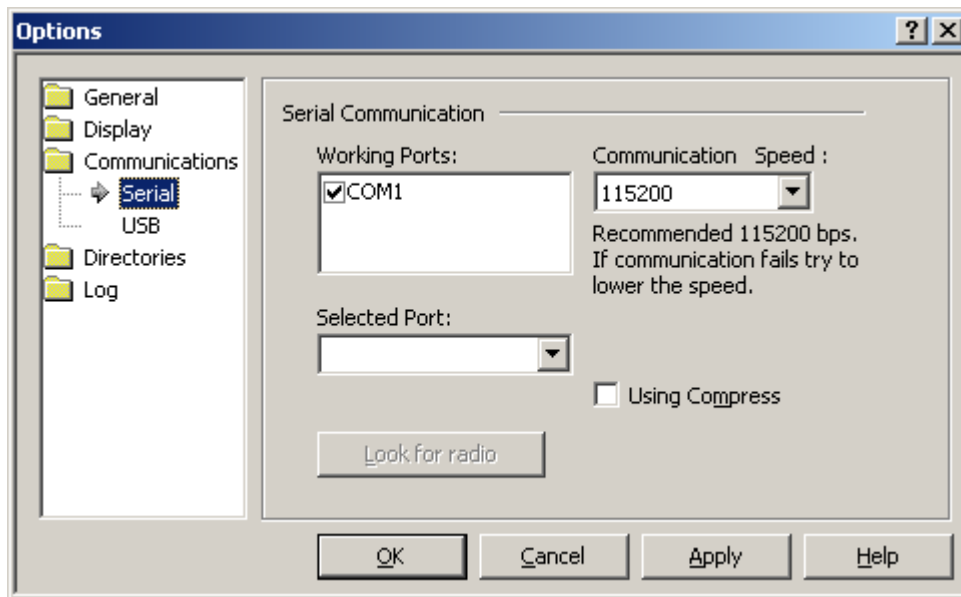
7.8.4.3 Communication



Enables the serial ports to be used in CPS-to-phone communication.

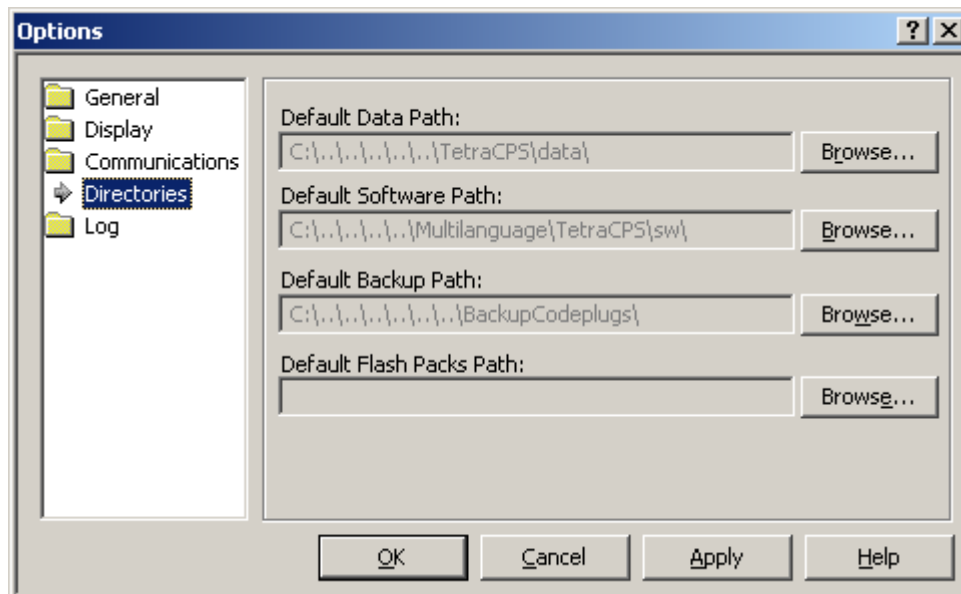
To define the working port and the communication speed, use the pointer and select the down arrows of the option windows and drag the pointer down to the desired value.

Serial Port selection options.



Note: Refer to your computer User Manual for a complete description of serial and parallel ports

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.

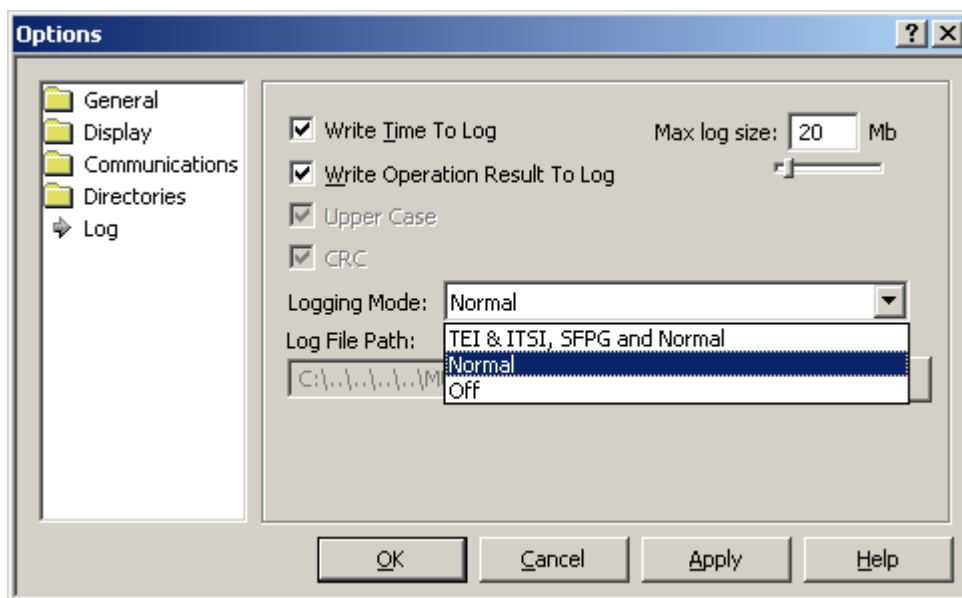
- **Default Software Path** — specifies the default path to the drive and folder (or directory) where the subscriber (flashing) software is located.
- **Default Backup Path** — specifies the default path to the drive and folder (or directory) where the codeplug backup files are located.
- **Default Flash 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.

Maximum Log Size:

This entry defines the maximum log file size. Click the slider to change the setting. The maximum size is 200 MB.

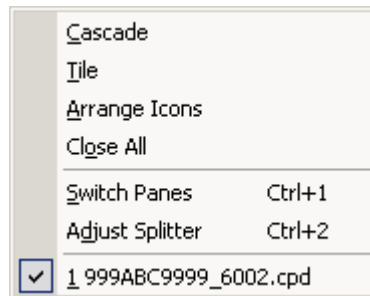
Over write Log Info as Needed: The "enabled" setting means that all new events will be written to the log, even when the log is full. When the log is full, each new event replaces the oldest one. The "disabled" setting means that existing events will be retained when the log is full. If the maximum log 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

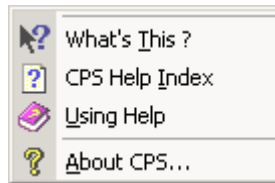
This is used to adjust the width of tree view and content view areas or the width of columns in the content view using the arrow keys on the keyboard.

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... (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



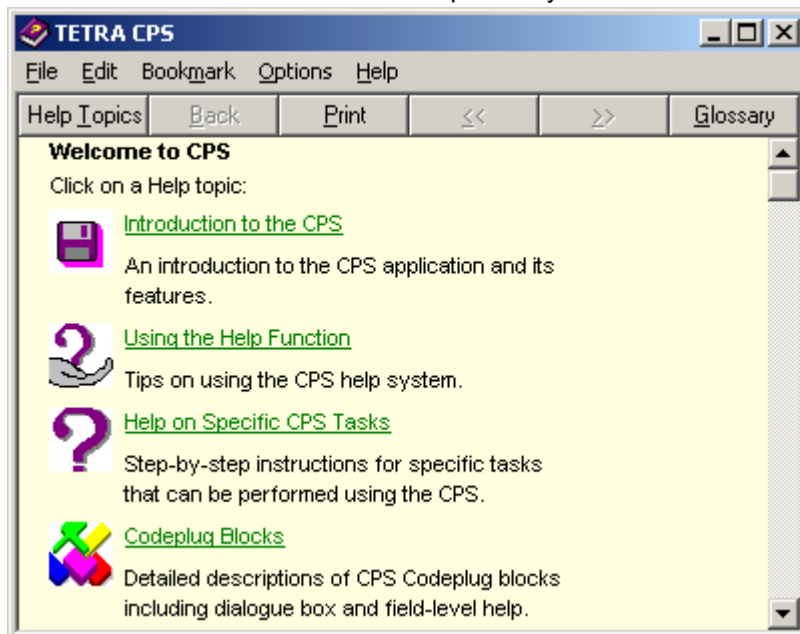
The Help Menu is similar to other Windows® based applications and has the following options:

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

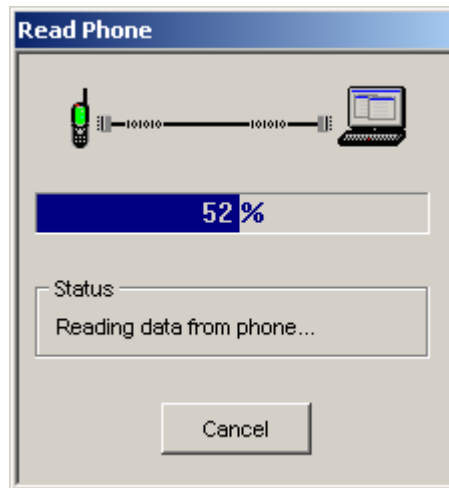
Selecting this menu item will open the CPS Help Index window. This window displays the available sub menus in a file card format which are self explanatory.



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

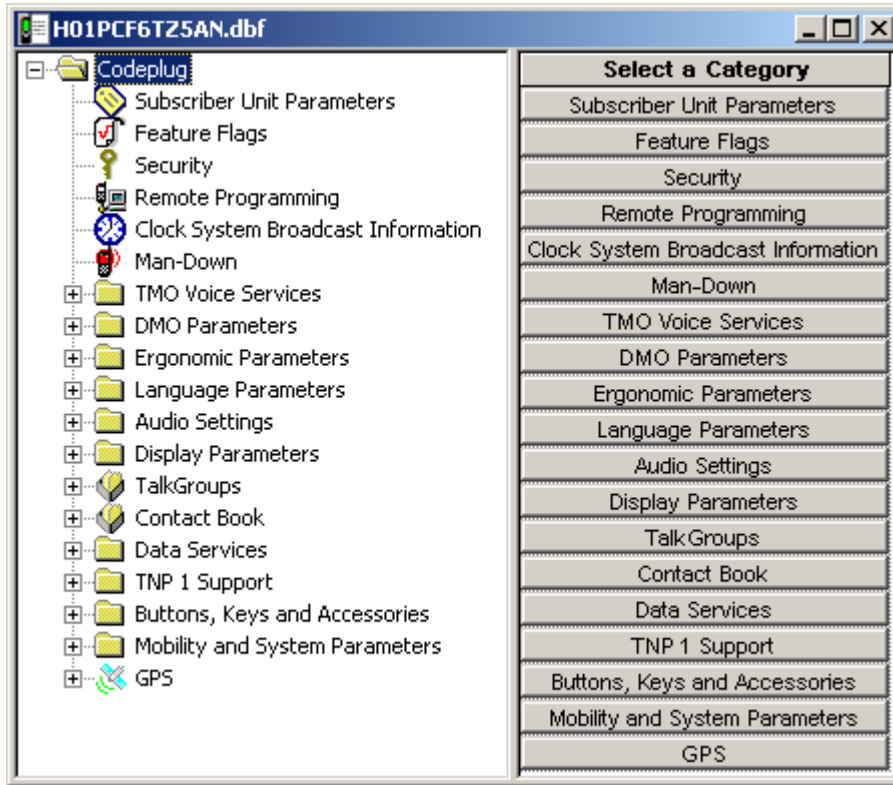
Once read, the codeplug will be displayed in the work screen for editing.

11 Phone Bar Icons

This bar, when selected, is displayed next to and on the same line as the main tool bar icons.

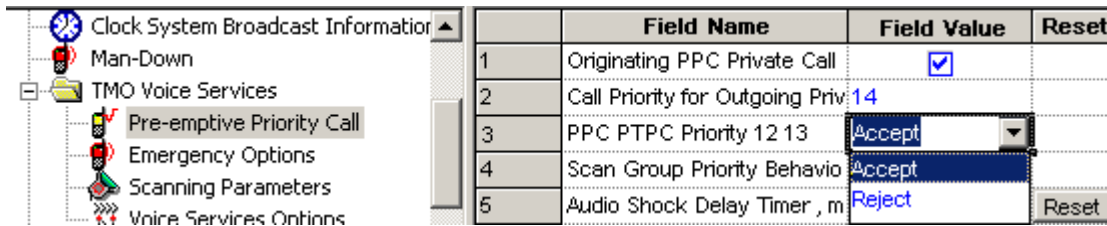
Placing the cursor over each icon will display its function, an explanation of which has previously been given. These icons are a short cut to the option they represent.

12 Codeplug



The top of the work screen will display terminal's identity.

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
- Remote Programming
- Clock System Broadcast Information
- Man-Down
- TMO Voice Services
- DMO Parameters
- Ergonomic Parameters
- Language Parameters
- Audio Settings
- Display Parameters
- TalkGroups
- Contact Book
- Data Services
- TNP1 Support
- Buttons, Keys and Accessories
- Mobility and System Parameters
- GPS

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
Codeplug Structure Version	0x0047	
Codeplug Defaults Version	0x0013	
Application Image		
Model Type	MTP850 380-430MHz L/KP ATEX PT911 BEx	
Model Number	H01PCF6TZ5AN	
Radio Hardware Id	Expand	
Copyright Notice	Copyright (c) 1995-2008, Motorola Inc.	
Equipment Temporary Disabled	<input type="checkbox"/>	
Subscription Temporary Disabled	<input type="checkbox"/>	
Equipment Permanently Disabled	<input type="checkbox"/>	
Subscription Permanently Disabled	<input type="checkbox"/>	
Serial Number	999ABC9999	
Radio TEI	F8F9FAFBFCDFEF	
Radio ISSI	100	Reset
Organization		
Person		
This Radio Phone Number		
This Radio Private Number		
Last Modification Date	July 03, 2008 13:48	
Programming Source	Factory(PATS)	
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, Subscription Temporary Disabled. 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, Subscription Permanently Disabled. The feature allows to disable only the Terminal's Equipment Identity (TEI). The equipment will not function. The disable operation may be performed during codeplug programming or by SwMi transmitting the disable command via air interface. User or TETRA protocol intervention cannot reverse the disable state.

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.

Organisation. 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
Codeplug		
Subscriber Unit Parameters		
Feature Flags	1 Group	<input checked="" type="checkbox"/>
Security	2 Status	<input checked="" type="checkbox"/>
Remote Programming	3 Targeted Status	<input type="checkbox"/>
Clock System Broadcast Information	4 Semi-Duplex Private Call	<input checked="" type="checkbox"/>
Man-Down	5 Private Duplex	<input checked="" type="checkbox"/>
TMO Voice Services	6 Direct Mode (DMO)	<input checked="" type="checkbox"/>
DMO Parameters	7 Direct Mode (DMO) Reservation	<input checked="" type="checkbox"/>
Ergonomic Parameters	8 Telephone Interconnect	<input checked="" type="checkbox"/>
Language Parameters	9 Mail In	<input checked="" type="checkbox"/>
Audio Settings	10 Mail Out	<input checked="" type="checkbox"/>
Display Parameters	11 External Device	<input checked="" type="checkbox"/>
TalkGroups	12 Test Page	<input type="checkbox"/>
Contact Book	13 PABX	<input checked="" type="checkbox"/>
Data Services	14 Talkgroup Scan	<input checked="" type="checkbox"/>
TNP 1 Support	15 Packet Data	<input checked="" type="checkbox"/>
Buttons, Keys and Accessories	16 Home Mode Display	<input checked="" type="checkbox"/>
Mobility and System Parameters	17 Group Hot Mic	<input checked="" type="checkbox"/>
GPS	18 DMO Gateway	<input checked="" type="checkbox"/>
	19 One-Touch Feature	<input type="checkbox"/>
	20 My Favorite Groups	<input checked="" type="checkbox"/>
	21 Speed Dialing	<input checked="" type="checkbox"/>
	22 GPS	<input type="checkbox"/>
	23 Flip Display	<input checked="" type="checkbox"/>
	24 Inbound High Pass Filter	<input type="checkbox"/>
	25 Energy Economy	<input checked="" type="checkbox"/>
	26 TNP1 Support	<input checked="" type="checkbox"/>
	27 Selected Network Enabled	<input checked="" type="checkbox"/>
	28 Address Book Restrictions	<input type="checkbox"/>
	29 Talk Group Dialing by Index	<input checked="" type="checkbox"/>
	30 WAP	<input type="checkbox"/>
	31 Mail Out To Group	<input type="checkbox"/>
	32 Direct Mode (DMO) Semi-Duplex Private Call	<input checked="" type="checkbox"/>
	33 Packet Data Page Enable	<input type="checkbox"/>
	34 Multislot Packet Data	<input type="checkbox"/>
	35 Low Voltage Disable Keypad Backlight	<input checked="" type="checkbox"/>
	36 DMO Repeater	<input checked="" type="checkbox"/>
	37 Clear LA Blacklist on Talk Group Change	<input type="checkbox"/>
	38 Remote Programming	<input checked="" type="checkbox"/>

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 26.2 "Status ID List"

Paragraph 26.4 "Short Data Service (SDS)"

Paragraph 28.3 "One Touch Buttons"

Paragraph 28.3.15 "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 26.2 "Status ID List"

Paragraph 26.4 "Short Data Service (SDS)"

Paragraph 28.3 "One Touch Buttons"

Paragraph 28.3.14 "Sending Targeted 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 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 19 "DMO Parameters"

Paragraph 24.2.2 "DMO Talkgroup List"

Paragraph 28.2 "One-Touch Options"

Paragraph 28.3 "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 25 "Contact Book"

Paragraph 28.2 "One-Touch Options"

Paragraph 28.3 "One Touch Buttons"

14.9 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.

14.10 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 26.1.1 "Outgoing Mail Options"

Paragraph 26.1.2 "Outgoing Mail List"

Paragraph 28.2 "One-Touch Options"

Paragraph 28.3 "One Touch Buttons"

14.11 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.

14.12 Test Page

Selecting this option enables field engineers to access various internal data via the test page sub menu.

14.13 PABX

This option is used to enable/disable the terminal's PABX Mode of operation.

See related fields:

Paragraph 25 "Contact Book"

Paragraph 28.2 "One-Touch Options"

Paragraph 28.3 "One Touch Buttons"

14.14 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 18.3 "Scanning Parameters"

Paragraph 24.1.4 "TMO Scan Lists"

Paragraph 28.2 "One-Touch Options"

Paragraph 28.3 "One Touch Buttons"

14.15 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

14.16 Home Mode Display

Enabling this feature will allow the terminal to display pre-programmed information when the terminal is inactive.

14.17 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 (in other words 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 (in other words listening to another user talking) or in the hang-time state (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 (that is another user is talking) or in the hang-time state (in other words there is no talker), the terminal will initiate Hot Mic transmission by sending an appropriate PDU 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 22.1 "Hot Mic"

14.18 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.

14.19 One-Touch Feature

This feature enables often used functions to be assigned to a single button press on the numeric keypad button.

Related fields are:

Paragraph 28.2 "One-Touch Options"

Paragraph 28.3 "One Touch Buttons"

14.20 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 terminal's memory.

Related field:

Paragraph 24.3 "My Favorite Groups"

14.21 GPS

Select this option to enable the GPS (Global Positioning System) feature of the terminal.

Paragraph 30 "GPS"

14.22 Flip Display

This function flips the display by 180 degrees.

If the flip display feature is disabled in the codeplug, the "Flip Display" cannot be assigned as one-touch function.

If the user disables the flip display feature, all the one-touch keys that include flip display become unassigned keys. An appropriate message alerts the user.

If the user has already assigned this function to another one-touch key, a message informs the user about it.

14.23 Inbound 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.

14.24 Energy Economy Mode

When the checkbox is enabled, the terminal attempts to operate in Energy Economy mode.

Energy Economy (EE) is a mode of operation where in order to save battery life the MS should not monitor all downlink slots of the MCCCH. The MS may enter the mode only after negotiation with the SwMI. In some situations user can prohibit or permit Energy Economy via user interface that IUA shall provide in this case. If radio is in charger, Energy Economy mode is not needed.

14.25 TNP1 Support

The TNP1 feature will operate only if Packet Data or External Device is enabled in the codeplug (for example a PPP session with MT2 can be established).

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

14.26 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.

14.27 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.

14.28 WAP

If enabled, WAP (Wireless Application Protocol) allows terminal (or device) accessing the internet.

14.29 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.

14.30 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.

14.31 Packet Data Page Enable

Enabling this feature will allow the terminal to display the packet data page.

14.32 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.

14.33 Low Voltage Disable Keypad Backlight

Specifies whether the Low Voltage Disable Keypad Backlight feature is supported or not.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

14.34 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.

14.35 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.

14.36 Remote Programming

If enabled, allows programming a mobile terminal via a wired 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.

14.37 Permanent Disable

The feature allows to disable only the MS permanently.

15 Security

	Field Name	Field Value
Codeplug		
Subscriber Unit Parameters		
Feature Flags		
Security		
Remote Programming		
Clock System Broadcast Information		
Man-Down		
TMO Voice Services		
DMO Parameters		
Ergonomic Parameters		
Language Parameters		
Audio Settings		
Display Parameters		
TalkGroups		
Contact Book		
Data Services		
TNP 1 Support		
Buttons, Keys and Accessories		
Mobility and System Parameters		
GPS		
1	MS Authentication	<input type="checkbox"/>
2	MS Mutual Authentication	<input type="checkbox"/>
3	Mandatory Mutual Authentication	<input type="checkbox"/>
4	SCK Air If Encryption	<input type="checkbox"/>
5	DMO SCK	<input type="checkbox"/>
6	DMO SCK OTAR	<input type="checkbox"/>
7	DCK Air If Encryption	<input type="checkbox"/>
8	GCK Air If Encryption and OTAR	<input type="checkbox"/>
9	Permanent Disable	<input type="checkbox"/>
10	Permanent Disable Policy	No Security
11	Temporary Enable/Disable Policy	No Security
12	Non Secured Call Indication	<input checked="" type="checkbox"/>
13	Encrypted Only	May Be Clear
14	Class 3 Cell Ranks Higher than Class 2 Cell	Cell 3 Is Equal
15	Key Erasure Mode	Erase All Keys Excep
16	Key Erasure Occurred	<input type="checkbox"/>
17	Maximum Retries Due Timeout T351-354	1
18	Activate Always Encryption	<input type="checkbox"/>
19	Covert Mode	Off

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.

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

If enabled, the terminal will be permanently killed when it receives the Permanent Disable command. The terminal software, codeplug and security key material are deleted. Unlike the Temporary Disable, the terminal cannot be recovered over the air but needs to be reprogrammed by the Service center personnel.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

15.10 Permanent Disable Policy

Defines the security policy for accepting a Permanent Disable command over the air.

The options are:

- No Security - No security is checked when radio is processing the Permanent Disable command.
- Encryption required – Permanent Disable command must be encrypted for it to be processed.
- Authentication required – Permanent Disable 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 – Permanent Disable 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 – Permanent Disable 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 – Permanent Disable 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.

To select the option, put the pointer into the field value, click on the arrow, and drag the pointer to the desired option.

Note: An authentication flag causes the start of authentication communication flow between the radio and the infrastructure.

15.11 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

15.12 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.

15.13 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.

15.14 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.

15.15 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 15.16 "Key Erasure Occurred"

15.16 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 15.15 "Key Erasure Mode"

15.17 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.

15.18 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.

15.19 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.

16 Clock System Broadcast Information

	Field Name	Field Value
1	Time Displayed	<input type="checkbox"/>
2	Date Displayed	<input type="checkbox"/>
3	Time Format	24-hour scale
4	Date Format	dd-mon-yy
5	Time Display by MMI	<input checked="" type="checkbox"/>
6	Setting Time by User	<input checked="" type="checkbox"/>
7	Local Time Offset, quarters	+0:00
8	RTC Update User Intervention	<input checked="" type="checkbox"/>

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 an appropriate 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.

16.1 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.

16.2 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.

16.3 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.

16.4 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

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.

16.5 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.

16.6 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.

16.7 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.

17 Man Down

	Field Name	Field Value
1	Man Down Radio Enable	<input type="checkbox"/>
2	Angle Feature Enable	<input type="checkbox"/>
3	No-movement Feature Enable	<input type="checkbox"/>
4	Time to Pre-alert for Angle	100
5	Time to Pre-alert for No-movement	100
6	Time to Alert for Angle	10
7	Time to Alert for No-movement	10
8	Activation Angle	45
9	No-movement Sensitivity	Med
10	Pre-alert Repeat Enable	<input checked="" type="checkbox"/>
11	Pre-alert Repeat Period	10
12	Feature Suspend Tone Enable	<input type="checkbox"/>
13	Feature Suspend Tone Gap	10

17.1 Man Down Radio Enable

To activate the Man Down feature, check the box. To deactivate, uncheck the box.

17.2 Angle Feature Enable

If enabled, the radio will be monitored for the duration it is horizontal or below the Activation Angle to decide if it will enter into Man-Down mode.

The radio will enter into the Man-Down mode if it is still horizontal or below the Activation Angle after some pre-programmed timers expire, an indication that the radio user has fallen down.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

Note:

- The timers are restarted anytime when the radio is moved above the Activation Angle before Man-Down mode is entered or when the PTT button is pressed.
- The Angle Feature functionality may be used together with the No-Movement Feature functionality but not the Movement Alarm functionality. Both the No-Movement Feature and Angle Feature functionalities may be possibly active at the same time and trigger independent pre-alert tone.

17.3 No-movement Feature Enable

If enabled, the radio will be monitored for the duration it is still to decide if it will enter into Man-Down mode.

The radio will enter into the Man-Down mode when the vibration that the radio perceives is below the sensitivity which has been selected after some pre-programmed timers expire, an indication that the radio user does not move any more.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

Note:

- The timers are restarted anytime when the radio is moved before the Man-Down mode is entered or when the PTT button is pressed.
- The No-Movement Feature functionality may be used together with the Angle Feature functionality but not the Movement Feature functionality. Both the No-Movement Feature and Angle Feature functionalities may be possibly active at the same time and trigger independent pre-alert tone.

17.4 Time to Pre-alert for Angle

This parameter sets the duration before playing an alert tone when used in the Angle Feature functionality.

Type the required value in the field.

17.5 Time to Pre-alert for No-movement

This parameter sets the duration before playing an alert tone when used in the No-movement Feature functionality.

Type the required value in the field.

17.6 Time to Alert for Angle

This parameter sets the duration the terminal waits to enter into Man Down mode after the pre-alert sounded when used in the Angle Feature functionality.

Type the required value in the field.

17.7 Time to Alert for No-movement

This parameter sets the duration the terminal waits to enter into Man Down mode after the pre-alert sounded when used in the Angle Feature functionality.

Type the required value in the field.

17.8 Activation Angle

This parameter defines the angle at which to trigger the Man Down timers to countdown to enter the Man Down mode.

To change the value, choose from a drop down list.

17.9 No-movement Sensitivity

This parameter sets the sensitivity of the movement sensor which is used for either the No-Movement or Movement Feature functionalities.

The sensitivity levels are:

- Min - Minimum vibration/movement will activate the functionality
- Med - Medium vibration will activate the functionality
- Max - Maximum vibration will activate the functionality

To change the value, choose from a drop down list.

17.10 Pre-alert Repeat Enable

If enabled, the pre-alert tone is repeated once per Pre-alert Period.

If disabled, the pre-alert tone will be played only once.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

17.11 Pre-alert Repeat Period

This parameter defines the time period after which the pre-alert tone is repeated when the Pre-alert Repeat Enable is enabled.

Type the required value in the field.

17.12 Feature Suspend Tone Enable

If enabled, every time the Man Down feature is enabled or disabled using the programmable side buttons, a tone is sounded.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

17.13 Feature Suspend Tone Gap

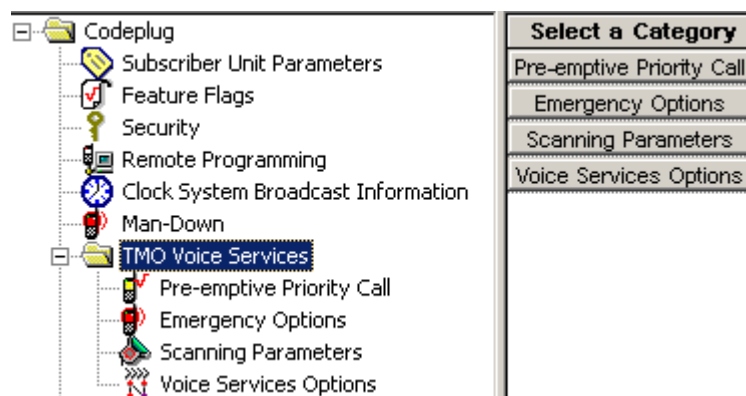
This parameter defines the time period between tone repetitions when the Feature Suspend Tone Enable is enabled.

Type the required value in the field.

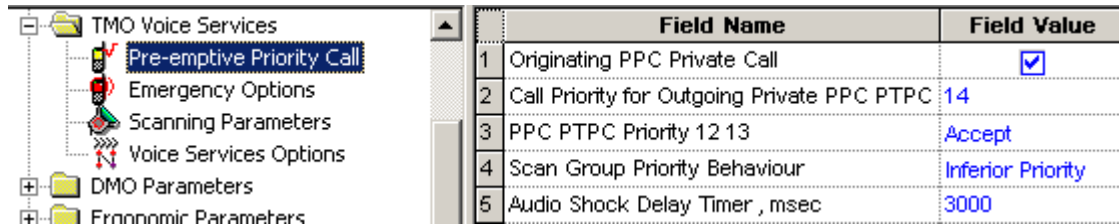
18 TMO Voice Services

This menu has the following 5 sub menus

- Pre-emptive Private Call
- Emergency Options
- Scanning Parameters
- Voices Services Options



18.1 Pre-emptive Priority Call (PPC)



	Field Name	Field Value
1	Originating PPC Private Call	<input checked="" type="checkbox"/>
2	Call Priority for Outgoing Private PPC PTPC	14
3	PPC PTPC Priority 12 13	Accept
4	Scan Group Priority Behaviour	Inferior Priority
5	Audio Shock Delay Timer , msec	3000

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.

18.1.1 Originating PPC Private Call

Selecting this check box allows PPC Private Calls to be made using this terminal.

18.1.2 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

18.1.3 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”.

18.1.4 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.

18.1.5 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.

18.2 Emergency Options

	Field Name	Field Value	Reset	
	1	Emergency Alarm	<input checked="" type="checkbox"/>	
	2	Emergency Call	<input checked="" type="checkbox"/>	
	3	TMO Emergency Services	Emergency Call/Alarm	
	4	Emergency Console Acknowledge	<input checked="" type="checkbox"/>	
	5	Emergency Switch Power Up	<input checked="" type="checkbox"/>	
	6	Emergency Call Type	Group	
	7	Emergency Started Timer, msec	500	Reset
	8	Emergency Cancel Timer, msec	2000	Reset
	9	Emergency Wait Ack Timer, sec	5	Reset
	10	Emergency Alarm Retries	7	Reset
	11	Emergency Group Address Type	Tactical	
	12	Emergency ISSI/GSSI	16777214	
	13	Non Tactical Alias		
	14	Emergency Private Call Type	Full-Duplex	
	15	Emergency SDS Status Destination	0	
	16	Emergency SDS Status Value	0	
	17	Emergency SDS Alias	Emgcy status	
	18	Disable Visible/Audible Indication	<input type="checkbox"/>	
	19	Colored Emergency	<input checked="" type="checkbox"/>	
	20	Emergency DMO to TMO	Stay in DMO Emergency	
	21	Emergency Alarm on Service Recovery	Always	
	22	Enter HotMic on Service Recovery	Never	

Related fields are:

Paragraph 14.17 "Group Hot Mic"

Paragraph 22.1 "Hot Mic"

18.2.1 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 18.2.6 "Emergency Call Type"

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 18.2.5 "Emergency Switch Power Up"

18.2.2 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 22.1 "Hot Mic"

18.2.3 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".

18.2.4 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.

18.2.5 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.

18.2.6 Emergency Call Type

Emergency Switch Power Up	<input checked="" type="checkbox"/>	
Emergency Call Type	Group	
Emergency Started Timer, msec	Group	Reset
Emergency Cancel Timer, msec	Private	Reset
Emergency Wait Ack Timer, sec	5	Reset
Emergency Alarm Retries	7	Reset

The terminal is able to set up an emergency call to either a Group or Private address (ISSI).

18.2.7 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 18.2.1 "Emergency Alarm"

18.2.8 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.

18.2.9 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.

18.2.10 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.

18.2.11 Emergency Group Address Type

There are 2 options, Tactical & Non Tactical.

- A tactical (normal) call allows the user to initiate the call on the currently selected talkgroup.
- 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.

Note: Not all systems support this feature.

18.2.12 Emergency ISSI/GSSI

This option defines where the emergency call is sent, this feature is not supported on all systems.

The address to which emergency calls will be sent, is entered in this field and can be either a group or private address (GSSI or ISSI). The default group address is 0.

Note: For radios configured for Non-Tactical Emergency, the Non-Tactical Emergency GSSI shall be added to TMO Talkgroup list (if not already present) before enabling the Enhanced Security license.

18.2.13 Non Tactical Alias

If the non tactical emergency call option is chosen, a name alias can be entered in this field.

18.2.14 Emergency Private Call Type

This (non-editable) field shows the call type of the terminal-initiated Emergency Private Call:

Full-Duplex.

18.2.15 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.

18.2.16 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.

18.2.17 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.

18.2.18 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.

18.2.19 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.

18.2.20 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.

18.2.21 Emergency Alarm on Service Recovery

This field 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.

18.2.22 Enter Hot Mic on Service Recovery

This field indicates whether the radio consistently enters into Hot Mic every time the radio returns to RF coverage. For cases where the emergency button was pressed when the radio was out of coverage.

18.3 Scanning Parameters

	Field Name	Field Value
1	Active List	
2	Scan Status	<input type="checkbox"/>
3	User List Editing	<input checked="" type="checkbox"/>
4	Priority Editing Enabled	<input checked="" type="checkbox"/>
5	PTT Operation	Talk Back
6	Presentation Mode	Force
7	On/Off via MMI	<input checked="" type="checkbox"/>
8	Block Group Enabled	<input type="checkbox"/>
9	Priority Presentation Timer, msec	8000
10	Scan Hold Timer, msec	5000
11	Rx Hold Timer, msec	5000
12	Scan On/Off over the Air	<input type="checkbox"/>

This menu has 12 options some of which are dependent on other programmable fields.

Related fields are:

Paragraph 14.14 "Talkgroup Scan"

Paragraph 24.1.4 "TMO Scan Lists"

Paragraph 28.2 "One-Touch Options"

Paragraph 28.3.17 "TMO Talkgroup Scan"

18.3.1 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.

18.3.2 Scan Status

Selecting this option will enable Talkgroup Scanning and is dependent on there being an entry in the Active List.

18.3.3 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.

18.3.4 Priority Editing Enabled

If this feature is enabled, the user is able to edit the priorities of the talkgroups in the scan lists.

18.3.5 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.

18.3.6 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.

18.3.7 On/Off Via MMI

If selected, this features enables the terminal's menu option that allows the user to turn scan on or off.

18.3.8 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.

18.3.9 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 msec

18.3.10 Scan Hold Timer

This entry determines the time period, in msec, for how long the scan is disabled while the user sets up a call to a selected group.

The default is 5000 msec

18.3.11 Rx Hold Timer

This entry determines the time period, in msec, 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 msec.

Related fields are:

Paragraph 14.14 "Talkgroup Scan"

Paragraph 28.2 "One-Touch Options"

Paragraph 28.3.17 "TMO Talkgroup Scan"

18.3.12 Scan List On/Off Over the Air

If enabled the terminal is able to send its scan list to the system.

18.4 Voice Services Options

	Field Name	Field Value
1	Default Call Priority	Priority Not Defined
2	Transmit Demand Priority	Pre-emptive Demand Priority
3	Transmit Demand Private Priority	Pre-emptive Demand Priority
4	PSTN Gateway ID	16777184
5	PABX Gateway ID	16767000
6	PTT ID	<input checked="" type="checkbox"/>
7	Busy Override	<input type="checkbox"/>
8	Announcement Talkgroup Enable	<input checked="" type="checkbox"/>
9	Embedded Number Enabled	<input type="checkbox"/>
10	Transmission Timeout Timer, sec	60
11	Transmission Timeout Warning Timer, s	50
12	PTT Call Back Timer (msec)	3000
13	PTT Call Back Timer Enabled	<input checked="" type="checkbox"/>
14	PTT During Received Group Call	<input checked="" type="checkbox"/>
15	Hook method for outgoing simplex indivi	Hook
16	Preferred hook method for incoming sim	Hook

This menu has the following options:

18.4.1 Default Call Priority

This Indicates the priority level of a call (before transmission begins). This field is non-editable.

18.4.2 Transmit Demand Priority

	Field Name	Field Value	Reset
1	Default Call Priority	Priority Not Defined	
2	Transmit Demand Priority	Pre-emptive Demand Priority	
3	Transmit Demand Private Priority	Low Demand Priority	
4	PSTN Gateway ID	High Demand Priority	
5	PABX Gateway ID	Pre-emptive Demand Priority	
6	PTT ID	Emergency Pre-emptive 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.

18.4.3 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.

18.4.4 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.

18.4.5 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.

18.4.6 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).

18.4.7 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.

18.4.8 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.

18.4.9 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.

18.4.10 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.

18.4.11 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.

18.4.12 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.

18.4.13 PTT Call Back Timer Enabled

This feature is Enabled/Disabled by clicking in the check box.

18.4.14 PTT During Received Group Call

The parameter enables or disables the PTT when receiving Group Call. When disabled, a PTT press is ignored during Group Call voice reception.

This feature is Enabled/Disabled by clicking in the check box.

18.4.15 Hook Method for Outgoing Simplex Individual Call

Defines the hook method setting when initiating a simplex individual call.

There are 2 types of hook method:

- Direct - an individual call is initiated with direct setup.
- Hook - an individual call is initiated with hook setup.

To select the option, put the pointer into the field value, click on the arrow, and drag the pointer to the desired option.

Note: Some infrastructures may not support direct signaling for individual calls.

18.4.16 Preferred Hook Method for Incoming Simplex Individual Call

Defines the hook method with which the MS prefers to receive simplex individual calls. If the MS receives a call with a different hook method, it will try to modify the call to its preferred hook method.

There are 2 types of hook method:

- Direct - MS is configured to receive individual call with direct setup. The call goes through directly without needing the recipient to accept the call, like in the case of group call.
- Hook - MS is configured to receive individual call with hook setup. The recipient needs to accept the individual call before a call can go through.

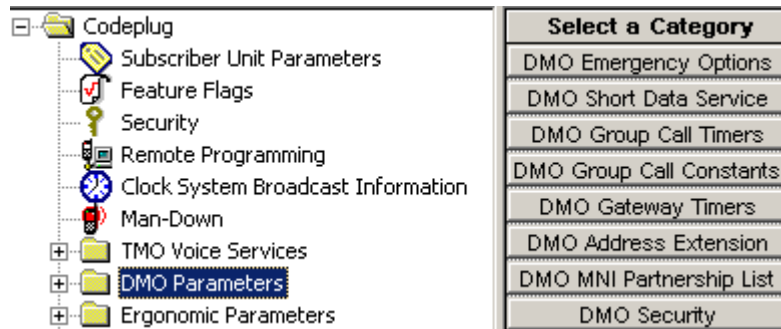
To select the option, put the pointer into the field value, click on the arrow, and drag the pointer to the desired option.

18.4.17 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.

19 DMO Parameters



Related field is:

Paragraph 14.6 "Direct Mode (DMO)"

Paragraph 14.7 "Direct Mode (DMO) Reservation"

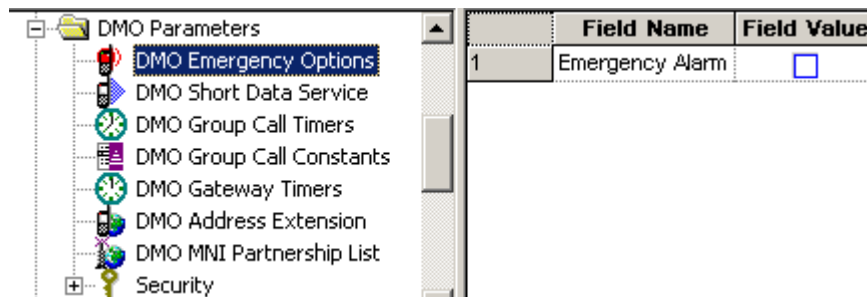
Paragraph 28.2 "One-Touch Options"

Paragraph 28.3.16 "TMO <=> DMO Switch"

This menu is used to set the parameters for Direct Mode Operation (DMO). When in DMO, the terminal acts like a normal 2 way radio and is not logged on to the system.

When selecting this menu the following option is displayed:

19.1 DMO Emergency Options




19.1.1 DMO Emergency Alarm

This option indicates whether the emergency alarm feature is enabled or disabled in the phone in Direct Mode Operation only.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

19.2 DMO Short Data Service



	Field Name	Field Value
1	DT314, msec	500
2	DN314	3
3	Pre-emption Timer, msec	1000
4	DMO Voice Priority over SDS	Voice has more priority than SDS

The feature offers TETRA Short Data Service (SDS) supporting transfer of short data messages and pre-coded status transfer called Status Transfer Service (STS) as well. For short data text messages all four types of data bearer service (SDS type 1|2|3|4) are supported. SDS Type 4 can be sent directly to the end user or via Service Centre (if provide by infrastructure).

19.2.1 DT314, Msec

This timer defines time-out for reporting SDS failure after sending DM-PRE ACCEPT.

The range for this timer is 0 - 1000 msecs.

19.2.2 DT314

This constant defines number of transmissions of unacknowledged DM-SDS UDATA packet data units.

The range for the constant is 1 - 6 times.

19.2.3 Pre-emption Timer

This timer defines the maximum time to wait for pre-emption response (DM-PRE ACCEPT or DM-REJECT).

The range for the timer is 0 - 5000 msecs.

19.2.4 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.

19.3 DMO Group Call Timers

	Field Name	Field Value	Reset
1	DMO Reservation Time, sec	5	Reset
2	DT211_R	7	
3	DT225	90	

19.3.1 DMO Reservation Time

Specifies the length of channel reservation for DMO calls in calls that the terminal initiates. During the reservation time other terminals that want to talk do not need to set up a new reservation. Instead, the current channel reservation may be used until the end of the timeout.

Related field:

This field is only available if the DMO Reservation feature is enabled, refer to Paragraph 14.7 "Direct Mode (DMO) Reservation".

19.3.2 DT211_R

Maximum time to wait for response to a single random access attempt in a call via repeater.

The range for this timer is 5 - 7 seconds.

The default is 7 seconds.

19.3.3 DT225

Inactivity time-out on the link from DM repeater for the Master DM MS in circuit mode call.

The range for this timer is 54 - 180 seconds.

The default is 90 seconds.

19.4 DMO Group Call Constants

	Field Name	Field Value	Reset
1	DN232	4	

Information on Random Access Messages

During the occupation and reservation periods, another DM-MS that wishes to transmit traffic or short data must first request and be granted permission by the current master before performing a set-up procedure and becoming master of the channel itself.

The DM-MS requests permission by sending the pre-emption or change over message. Since more than one DM-MS may be attempting to request use of the channel, a random access protocol is

used. The random access protocol is also used if the DM-MS wishes to send a timing change request to the master DM-MS.

Pre-emption requests may be sent during short data occupation.

Pre-emption and timing change requests may be sent while the channel is in circuit mode occupation.

Pre-emption, timing change and changeover requests may be sent during channel reservation periods.

19.4.1 DN232

Number of frames for the Master DM MS, during which it expects the DM repeater to re-transmit its DM setup messages, in case the DM repeater presence signal was not received previously.

The range for this timer is 2 - 4 seconds.

The default is 4 seconds.

19.5 DMO Gateway Timers

	Field Name	Field Value	Reset
1	DT301,sec	1	Reset
2	DT302,sec	10	Reset
3	DT309,sec	5	Reset
4	Preemption via Gateway Timer (DT308), sec	30	Reset

A DMO Gateway is equipment that can fulfil two roles:

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 4 options:

19.5.1 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 1 second.

The following are related fields:

Paragraph 14.18 "DMO Gateway"

Paragraph 14.7 "Direct Mode (DMO) Reservation"

Paragraph 19.5.2 "DT302"

Paragraph 19.5.4 "DT308, Pre-emption via Gateway Timer"

Paragraph 19.5.3 "DT309"

19.5.2 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.

The following are related fields:

Paragraph 14.18 "DMO Gateway"

Paragraph 14.7 "Direct Mode (DMO) Reservation"

Paragraph 19.5.1 "DT301"

Paragraph 19.5.4 "DT308, Pre-emption via Gateway Timer"

Paragraph 19.5.3 "DT309"

19.5.3 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.

Other related fields are:

Paragraph 14.18 "DMO Gateway"

Paragraph 14.7 "Direct Mode (DMO) Reservation"

Paragraph 19.5.1 "DT301"

Paragraph 19.5.2 "DT302"

Paragraph 19.5.4 "DT308, Pre-emption via Gateway Timer"

19.5.4 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.

Related fields are:

Paragraph 14.18 "DMO Gateway"

Paragraph 14.7 "Direct Mode (DMO) Reservation"

Paragraph 18.3.9 "Priority Presentation Timer"

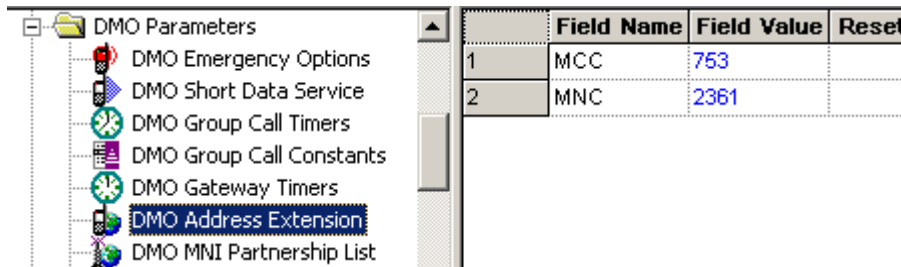
Paragraph 19.5.1 "DT301"

Paragraph 19.5.2 "DT302"

Paragraph 19.5.3 "DT309"

Note: Selecting the reset option for each of the above timers will enter the factory default setting in the Field Value box.

19.6 DMO Address Extension



	Field Name	Field Value	Reset
1	MCC	753	
2	MNC	2361	

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.

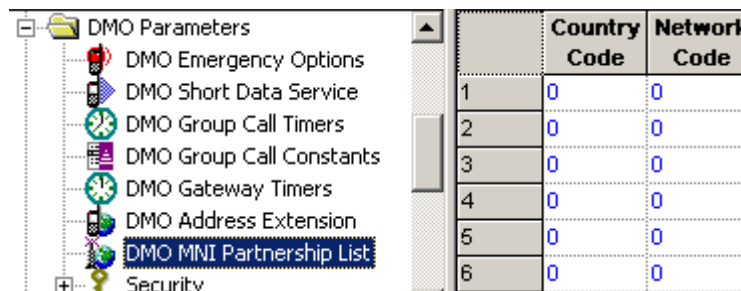
19.6.1 MCC

The entry in this field defines the country code for the country in which the gateway is operating.

19.6.2 MNC

The entry in this field defines the system operating (licence number) number obtained from the in country licensing authority.

19.7 DMO MNI Partnership List



	Country Code	Network Code
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0

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.

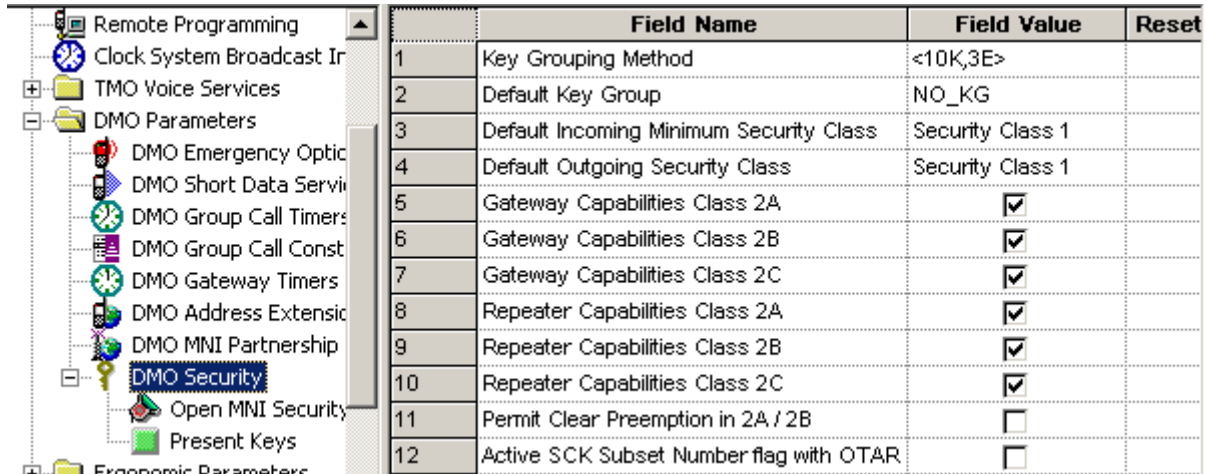
The terminal conducts an inter-MNI call if:

- The terminal initiates of a call to a foreign MNI

- The terminal joins a call addressed to a foreign MNI (for example open MNI).

That is, reception of a call from a 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.

19.8 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	<input checked="" type="checkbox"/>	
6	Gateway Capabilities Class 2B	<input checked="" type="checkbox"/>	
7	Gateway Capabilities Class 2C	<input checked="" type="checkbox"/>	
8	Repeater Capabilities Class 2A	<input checked="" type="checkbox"/>	
9	Repeater Capabilities Class 2B	<input checked="" type="checkbox"/>	
10	Repeater Capabilities Class 2C	<input checked="" type="checkbox"/>	
11	Permit Clear Preemption in 2A / 2B	<input type="checkbox"/>	
12	Active SCK Subset Number flag with OTAR	<input type="checkbox"/>	

19.8.1 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 KG_{*j*} is composed of SCKs *j*, *j*+*K*, *j*+2*K*, ..., *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>.

19.8.2 Default Key Group

This is 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 KG_{*j*}(*j*=1 ... *K*) or NO_KG.

19.8.3 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.

19.8.4 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.

19.8.5 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.

19.8.6 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.

19.8.7 Permit Clear Preemption in 2A / 2B

Click to activate/deactivate Boolean flag indicating if calls in security classes 2A/2B may be preempted in clear.

19.8.8 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.

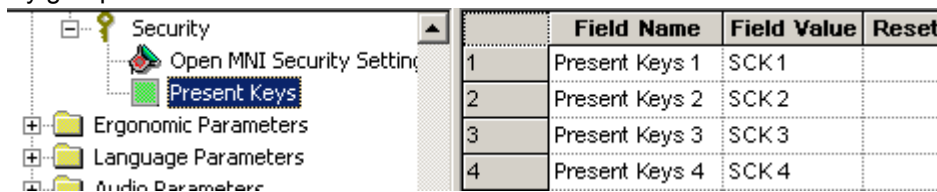
19.8.9 Open MNI Security Settings

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	<input checked="" type="checkbox"/>	NO_KG	Security Class 1	Security Class 1
753	2361	<input checked="" type="checkbox"/>	NO_KG	Security Class 1	Security Class 1
0	0	<input type="checkbox"/>	NO_KG	Security Class 1	Security Class 1
0	0	<input type="checkbox"/>	NO_KG	Security Class 1	Security Class 1
0	0	<input type="checkbox"/>	NO_KG	Security Class 1	Security Class 1
0	0	<input type="checkbox"/>	NO_KG	Security Class 1	Security Class 1
0	0	<input type="checkbox"/>	NO_KG	Security Class 1	Security Class 1
0	0	<input type="checkbox"/>	NO_KG	Security Class 1	Security Class 1

19.8.10 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.



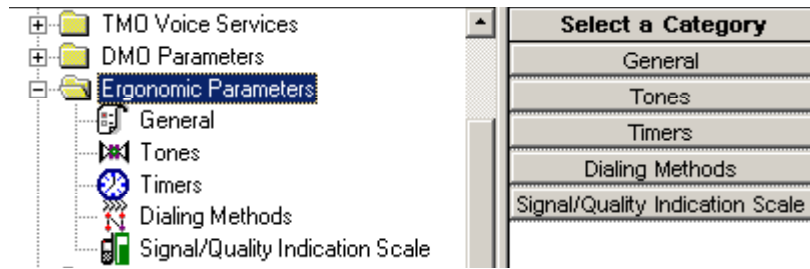
	Field Name	Field Value	Reset
1	Present Keys 1	SCK 1	
2	Present Keys 2	SCK 2	
3	Present Keys 3	SCK 3	
4	Present Keys 4	SCK 4	

When key grouping methods is $\langle K, E \rangle$ (except for $\langle 30K, 1E \rangle$) the table shall contain exactly K entries and each entry represents a key-group KG_j $j=1 \dots K$. For each key-group KG_j ($j=1 \dots K$) one of the E SCKNs of this key group can be selected. The list of SCKNs for each key-group is preset (the SCKN number cannot be typed). Each key-group is composed of SCKs $j, j+K, j+2K, \dots, j+(E-1) \cdot K$.

When the current pattern is $\langle 30K, 1E \rangle$ every key group KG_j has a single edition SCK $_j$ which is the present edition. Therefore the table may not exist (or shall not be editable).

For example - when the current pattern is $\langle 10K, 3E \rangle$, the present key of KG_7 can be one of SCK $_7$, SCK $_{17}$ or SCK $_{27}$, and similarly for all key groups KG_1 $KG_2 \dots KG_{10}$.

20 Ergonomic Parameters



This has the following sub menus:

- General
- Tones
- Timers
- Dialing Methods
- Signal/Quality Indication Scale

20.1 General

	Field Name	Field Value	Reset
1	Ring Style	British	
2	Speaker Phone	<input checked="" type="checkbox"/>	
3	Range Scroll Type	Scroll to Next Range	
4	Energy Economy Mode via MMI	<input type="checkbox"/>	

The options in this sub menu are the following.

20.1.1 Ring Style

	Field Name	Field Value	Reset
1	Ring Style	British	
2	Speaker Phone	British	
3	Range Scroll Type	Style 2	
4	Energy Economy Mode via MMI	Style 3	
		French	
		German	
		Bravo	
		Three Digs	

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.

20.1.2 Range Scroll Type

	Field Name	Field Value	Reset
1	Ring Style	British	
2	Speaker Phone	<input checked="" type="checkbox"/>	
3	Range Scroll Type	Scroll to Next Range	
4	Energy Economy Mode via MMI	Scroll Stay in Range	

This option defines how the rotary control behaves when scrolling the Talkgroup range(s). The terminal will either 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.

Related field:

Paragraph 28.4 "Rotary Knob Options"

20.1.3 Energy Economy Mode Via MMI

When the checkbox is enabled, the user can enable or disable Energy Economy Mode via the terminal's display.

Energy Economy (EE) is a mode of operation where in order to save battery life the terminal should not monitor all downlink slots of the MCCH. The terminal may enter the mode only after negotiation with the SwMI. In some situations user can prohibit or permit Energy Economy via user interface that IUA shall provide in this case. If terminal is in charger, Energy Economy mode is not needed.

20.2 Tones

	Field Name	Field Value
1	Periodic Tone	<input checked="" type="checkbox"/>
2	DTMF	<input checked="" type="checkbox"/>
3	Group Call Received Tone	<input type="checkbox"/>
4	Group Call Audio Via MMI	<input checked="" type="checkbox"/>
5	Audio Toggle	Always Loud

There are 5 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.

Related fields are:

Paragraph 22.3.7 "Alert Tones Volume"

Paragraph 22.3.8 "Ring Tones Volumes"

20.2.1 Periodic Tone

If enabled, the terminal will sound a tone periodically when in a non-operational state (in other words no service).

This feature is Enabled/Disabled by clicking in the check box.

20.2.2 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.

20.2.3 Group Call Received Tone

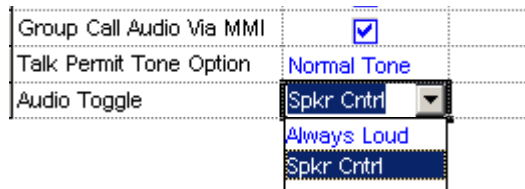
If enable the received Group Call Alert will sound.

This feature is Enabled/Disabled by clicking in the check box.

20.2.4 Group Call Audio via MMI

Selecting this option enables the Group Audio sub menu in the terminal’s menu list, if not selected, the sub menu will not be visible to the user.

20.2.5 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.

20.3 Timers



	Field Name	Field Value	Reset
1	Out Of Service Timer, sec	120	Reset
2	Long Key Inactivity Timer, sec	60	Reset
3	Channel Acquisition Timer, sec	30	Reset
4	Call Delay on User Activity, msec	5000	Reset

There are 4 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.

20.3.1 Out of Service Timer

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.

20.3.2 Long Key Inactivity Timer

This timer defines the time duration of no user input/activity, for example 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,

20.3.3 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.

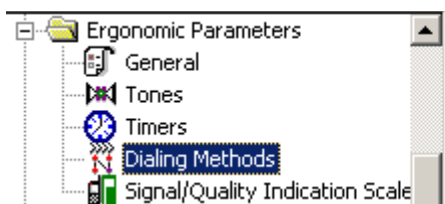
The range for this timer is 0 - 300 seconds, the default setting is 30 seconds.

20.3.4 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).

The range for this timer is 5000 - 5000 msec, the default setting is 5000 msec.

20.4 Dialing Methods



	Field Name	Field Value	Reset
1	Default Call Type	First in Type Order	Reset
2	Type Order	Private-Phone-PABX	Reset

This menu sets the dialing method parameters. These are a set of options that control the way the Terminal behaves when the user dials a number.

20.4.1 Default Call Type

	Field Name	Field Value	Reset
1	Default Call Type	First in Type Order	Reset
2	Type Order	Last Active	Reset
		First in Type Order	

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.

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 dialing.

20.4.2 Type Order

	Field Name	Field Value	Reset
1	Default Call Type	First in Type Order	Reset
2	Type Order	Private-Phone-PABX	Reset

Private-Phone-PABX

Phone-PABX-Private

PABX-Private-Phone

Private-PABX-Phone

Phone-Private-PABX

PABX-Phone-Private

Indicates the sequence in which the call types appear to the user when the user presses the 'Call Type' 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, & Paragraph 14.14 "Talkgroup Scan"

For the Phone and PABX Call, the corresponding feature needs to be enabled, Paragraph 14.8 "Telephone Interconnect" & Paragraph 14.14 "Talkgroup Scan"

20.5 Signal/Quality Indication Scale

	Field Name	Field Value	Reset
1	Signal Strength Max Nobars	9	Reset
2	Signal Strength Min Maxbars	35	Reset

These two fields are used for setting the number of bars that will be displayed to represent received signal strength.

20.5.1 Signal Strength Maximum 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 loses 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.

20.5.2 Signal Strength Minimum 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.

21 Language Parameters



This menu has 3 options 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.

21.1 Language Settings

	Field Name	Field Value
1	Default Language Choice	BRITISH ENGLISH
2	BRITISH ENGLISH	<input checked="" type="checkbox"/>
3	ARABIC	<input checked="" type="checkbox"/>
4	CHINESE COMPLEX	<input checked="" type="checkbox"/>
5	CHINESE SIMPLE	<input checked="" type="checkbox"/>
6	FRENCH	<input checked="" type="checkbox"/>
7	GERMAN	<input checked="" type="checkbox"/>
8	ITALIAN	<input checked="" type="checkbox"/>
9	SPANISH	<input checked="" type="checkbox"/>
10	DUTCH	<input checked="" type="checkbox"/>
11	GREEK	<input checked="" type="checkbox"/>
12	HUNGARIAN	<input checked="" type="checkbox"/>
13	KOREAN	<input checked="" type="checkbox"/>
14	LITHUANIAN	<input checked="" type="checkbox"/>
15	NORWEGIAN	<input type="checkbox"/>
16	RUSSIAN	<input checked="" type="checkbox"/>
17	SWEDISH	<input checked="" type="checkbox"/>
18	USER DEFINED LANGUAGE	<input type="checkbox"/>

Select the check box for the required language.

Note: The options are restricted if the CPS is opened using the 'User Login'.

21.2 User Defined Language

Message ID	Default Message	User Message	Default Abbreviation	User Abbreviation
SHORTCUTS	Shortcuts	Shortcuts	Shortcuts	Shortcuts
DELETE_COLON	Delete :	Delete :	Delete :	Delete :
QUESTION_MARK	?	?	?	?
COMM_24_HR	24hr	24hr	24hr	24hr
COMM_ALARM	Alarm	Alarm	Alarm	Alarm
COMM_APRIL	Apr	Apr	Apr	Apr
COMM_BACKLIGHT	Backlight	Backlight	Backlight	Backlight
COMM_CALL_FORWARD	Call Forward	Call Forward	Call Forward	Call Forward
COMM_COLON	:	:	:	:

There are 1167 user editable options available in this field, not all languages are fully supported.

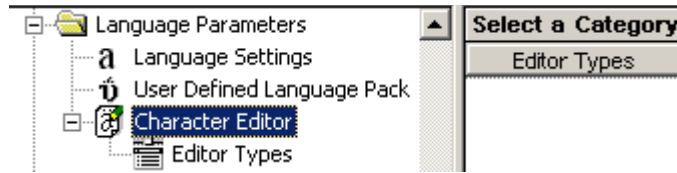
21.2.1 User Message

Default Messages/prompts are edited in the User Message Field.

Enter the language equivalent of the Default Message in the adjacent User Message field.

21.3 Character Editor

IMPORTANT: For the Limited Keypad these settings are not usable.



The Character Editor is the feature used to create different types of editors in the terminal.

The iTAP feature is a feature within the Character Editor that when enabled, the terminal will preempt user character entry with a suggested whole word.

The TAP entry method is the normal user character entry method in the 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.

Abbreviations and Acronyms:

Editor Type - The Character Editor can appear in different specialized forms (types): number editor, message editor, name editor.

Character Type - A parameter used in the actual code – the character type determines the editor type (relevant for developers only).

Entry Mode - One of four: Either primary (chosen primary text entry method, see below), numeric (numbers only), symbol (symbols only) or secondary (chosen secondary text entry method, see below).

Entry Method - Text entry method and language used in the character editor. It can be either TAP or iTAP for each language enabled in the phone (for example: TAP English, iTAP English, TAP Spanish, iTAP Spanish, and so forth)

Primary Entry Method - Main text entry method in the character editor. Also used as the default method for the editor type.

Secondary Entry Method - Additional text entry method in the character editor.

TAP - Standard entry method in editors.

iTAP - Intelligent TAP – an advanced predictive text entry method developed by Lexicus.

Note: When the default parameter in the codeplug is changed, all the features using the same editor type, will be affected.

21.3.1 Editor Types

	Field Name	Field Value	Reset
1	Primary Message Method	TAP of Current Phone Language	Reset
2	Secondary Message Method	None	Reset
3	Primary Name Method	TAP of Current Phone Language	Reset
4	Secondary Name Method	None	Reset

The Character Editor can appear in different specialized forms (types): number editor, message editor, name editor.

Each of these fields has 99 options. There are 49 language options with a choice of either TAP or iTAP for text entry and an option to select 'TAP of Current Phone Language'.

22 Audio Settings

The following sub menus are available:

- Hot Mic
- User Profiles

22.1 Hot Mic

	Field Name	Field Value	Reset
1	HotMic Pending Timer, sec	30	Reset
2	HotMic Duration Timer, sec	300	Reset
3	Hot Mic Gain Delta	0	

This sub menu has 3 editable options, 2 of which have reset options to set factory default values.

Related fields are:

Paragraph 18.2.1 "Emergency Alarm"

Paragraph 18.2.2 "Emergency Call"

Paragraph 14.17 "Group Hot Mic"

Paragraph 18.2 "Emergency Options"

22.1.1 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, and the default setting is 30 seconds

22.1.2 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, and the default setting is 300 seconds

22.1.3 Hot Mic Gain Delta

This option is used to set the mic gain when the terminal enters emergency mode.

The levels are in dB 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.

22.2 Audio Profile

An audio profile is a profile that adjusts the audio parameters of the terminal, so that it can be changed to fit its current operating environment. The following parameters can be varied per audio profile according to a particular working environment:

- Receive and transmit gains
- Receive and transmit EQ filters
- AGC, Echo Cancellor and TX Noise suppressor
- Tone volume

To enable any of the 7 audio profiles available, named “User Profile 1” to “User Profile 7”, check the box next to the Enable Audio Profile field. Depending on provider’s settings the terminal user can choose the enabled audio profiles via MMI.

Field Name	Field Value	Reset
Enable Audio Profile	<input checked="" type="checkbox"/>	
Profile Alias/Name	Profile 1	
Select Template	General Purpose	Reset
Editable	General Purpose Indoor Outdoor, Noisy type1 Outdoor, Noisy type2 Outdoor, Noisy type3 Outdoor, Harsh type1 Outdoor, Harsh type2	

The Audio Profiles are created basing on Audio Templates provided by Motorola. These templates can not be changed. Several Audio Profiles can be created based on the same template. For each Audio Profile, an Audio Template can be chosen from the following list:

- General purpose
- Indoor
- Outdoor, Noisy type1
- Outdoor, Noisy type2
- Outdoor, Noisy type3
- Outdoor, Harsh type1
- Outdoor, Harsh type2

To change the template assigned to an Audio Profile, choose from the “Select Template” drop-down list.

22.3 Audio Parameters

Each profile controls gain settings in receive and transmit paths as well as filters. Audio parameters are already stored in the codeplug for each audio mode that the terminal can operate in.

The following sub menus are available:

- Mic Gain
- Speech volume
- Howling Suppression
- AGC
- Voice Filters
- Ambience Listening
- Alert Tones Volumes
- Ring Tones Volumes
- Key Clicks Tones Volumes
- DTMF Tones Volumes

22.3.1 Mic Gain

The following screen shot shows the features available on the terminal.

This sub menu is used to set the microphone volume used when the terminal is operated with a Inductive Loop, Inductive Patch or PHF.

22.3.2 Speech Volume

This sub menu is used to set the terminal speech volume.

22.3.3 Howling Suppression

This sub menu is used to set the Howling Speaker and Microphone gain reduction.

22.3.4 AGC

Enables selection of the parameters for the AGC (Automatic Gain Control) Enable Register.

Select one of the following parameters:

- No receiving and no attenuation.
- External Microphone 12 dB attenuator - When this feature is enabled, 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, 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 attenuation.

To choose the setting, put the pointer into the field value, click on the arrow, and drag the pointer to the desired value.

22.3.5 Voice Filters

The parameters are responsible for transmission and reception Noise Suppression, Echo Control, and Echo Suppression Threshold to further enhance the audio quality of the terminal.

22.3.6 Ambience Listening

	Field Name	Field Value
1	AL Handset	31
2	AL Heavy	10
3	AL Light	12
4	AL Hurricane	20
5	AL Skull	25
6	AL RSM	31
7	AL Throat	25

These parameters set the volume heard in the respective accessory during the Ambience Listening.

22.3.7 Alert Tones Volume

An alert is a tone the phone sounds to alert the user of various events. This page allows changing codeplug values of the alert tone volumes for the various alert tone modes listed in the window.

The value displayed by a field is a relative number showing how loud that particular parameter is set to.

The bigger the number, the greater is the value of that parameter.

To set the required audio level, first select the Field Value box to display the down arrow, selecting the down arrow will display the available options.

22.3.8 Ring Tones Volumes

The ring tone is the sound made when a call arrives. This page allows changing the codeplug values of the maximum ring tone volumes for the various speakers listed in the window.

The value displayed by a field is a relative number showing how loud that particular parameter is set to.

The bigger the number, the greater is the value of that parameter.

To choose the level, put the pointer into the field value, click on the arrow, and drag the pointer to the desired level.

22.3.9 Key Clicks Tones Volume

The key clicks tone is the sound made when a key is pressed. This page allows changing the codeplug values of the maximum key clicks tone volumes for the various speakers listed in the window.

The value displayed by a field is a relative number showing how loud that particular parameter is set to.

The bigger the number, the greater is the value of that parameter.

To choose the level, put the pointer into the field value, click on the arrow, and drag the pointer to the desired level.

22.3.10 DTMF Tones Volume

The DTMF tone is the sound made when a DTMF is sent. This page allows changing the codeplug values of the maximum DTMF tone volumes for the various speakers listed in the window.

The value displayed by a field is a relative number showing how loud that particular parameter is set to.

The bigger the number, the greater is the value of that parameter.

To choose the level, put the pointer into the field value, click on the arrow, and drag the pointer to the desired level.

22.3.11 Tones

22.3.11.1 Clear to Send Tone

Specifies if the called person will hear a short beep during a Group Call or a Private Call when the caller ends the transmission by releasing the PTT.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

22.3.11.2 Talk Permit Tone Option

Defines the duration of the Talk Permit Tone when the user presses the PTT button.

There are 3 settings:

- No Tone
- Short tone (a single tone heard upon pressing the PTT).
- Normal tone (the factory-default tone heard upon pressing the PTT).

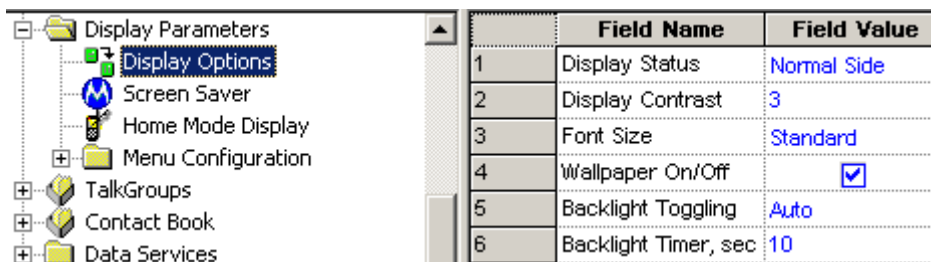
To select the option, put the pointer into the field value, click on the arrow, and drag the pointer to the desired option.

23 Display Parameters



The options available within these sub menus are used for the terminal's display configuration.

23.1 Display Options



The available 6 options in this sub menu are used to configure the appearance of the display.

23.1.1 Display Status

	Field Name	Field Value	Reset
1	Display Status	Normal Side	
2	Display Contrast	Normal Side	
3	Font Size	Flip Side	
4	Wallpaper On/Off	<input checked="" type="checkbox"/>	
5	Backlight Toggling	Auto	
6	Backlight Timer, sec	10	Reset

This feature has two options and which ever is chosen will determine the default view of the display. The view options are Normal Side and Flip Side. The Flip Side feature is particularly useful for a user who has to wear the terminal on the shoulder, a belt, or lapel and wishes to read the display upside down.

This function to be enabled/disabled by one press on a programmable terminal button.

Related field:

Paragraph 28.2 "One-Touch Options"

Paragraph 28.3.13 "Flip Display"

23.1.2 Display Contrast

This option is used to set the contrast of the terminal's display. This setting will improve the clarity of the information displayed and improve viewing in bright conditions.

The contrast level of the display can be set from 1 to 6 in steps of 1.

23.1.3 Font Size

	Field Name	Field Value	Reset
1	Display Status	Normal Side	
2	Display Contrast	3	
3	Font Size	Standard	
4	Wallpaper On/Off	Standard	
5	Backlight Toggling	Zoomed	
6	Backlight Timer, sec	Extra Zoomed	Reset

Selecting the Filed Value down arrow will display the Standard, Zoomed, or Extra Zoomed options.

If Zoomed or Extra Zoomed is chosen as the default, the size of the font is increased, but the amount of information displayed is reduced.

23.1.4 Wallpaper On/Off

This option is used to enable/disable a predefined display background.

Related field:

Paragraph 28.2 "One-Touch Options"

Paragraph 28.3.18 "Backlight Adjustment"

23.1.5 Backlight Toggling

	Field Name	Field Value	Reset
1	Display Status	Normal Side	
2	Display Contrast	3	
3	Font Size	Standard	
4	Wallpaper On/Off	<input checked="" type="checkbox"/>	
5	Backlight Toggling	Auto	
6	Backlight Timer, sec	Disabled	Reset

Selecting the Field Value down arrow will display the following three options:

Disabled - Selecting this option disables the display backlight.

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.

23.1.6 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.

23.2 Screen Saver

	Field Name	Field Value	Reset
1	Screen Saver Text		
2	Timer Screen Saver Activation, msec	35000	Reset
3	Screen Saver Enabled	<input checked="" type="checkbox"/>	
4	Screen Saver Text User Editable	<input checked="" type="checkbox"/>	
5	Auto Screen Saver	<input checked="" type="checkbox"/>	

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.

23.2.1 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.

23.2.2 Time Screen Saver Activation

This field is used to set the time, in msec, after which the screen saver text message will be displayed. The range is 1000 - 216,000,000 msec and the default is 35,000 msec.


23.2.3 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.

23.2.4 Auto Screen Saver

If enabled, the screen saver will automatically be displayed after a default period of terminal inactivity.

23.3 Home Mode Display



	Field Name	Field Value	Reset
1	Home Mode Display Text		
2	Home Mode Display Protocol Identifier	220	Reset
3	Welcome Screen		

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.

23.3.1 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.

23.3.2 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, for example DGNA updates.

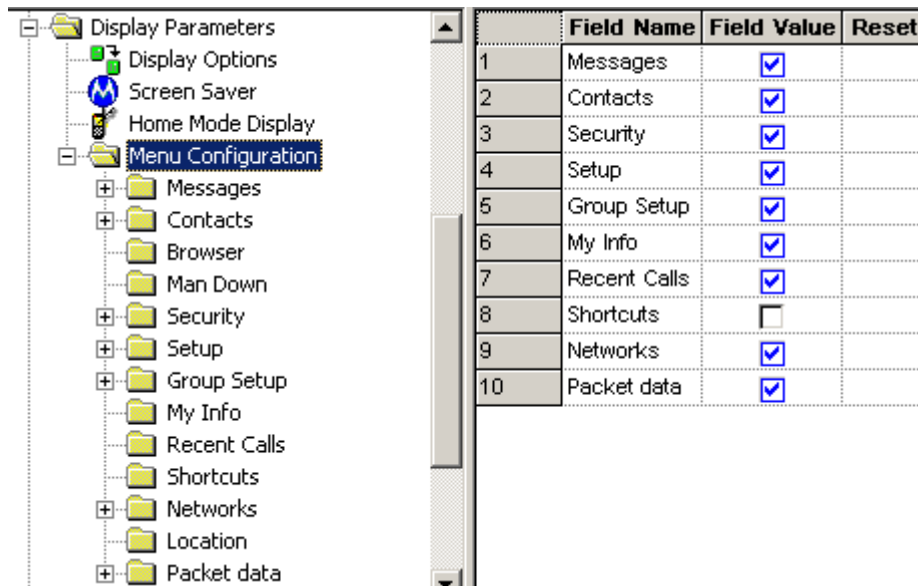
The range is from 0 to 255, the default is 220.

For more information see: ETSI EN300 392 - 2 Paragraph 29.4.3.9 Table 439.

23.3.3 Welcome Screen

An alphanumeric text string of up to 36 characters can be entered in this field and will be displayed as the terminal powers up.

23.4 Menu Configuration



The screenshot shows a software interface for menu configuration. On the left is a tree view under 'Display Parameters' with 'Menu Configuration' selected. On the right is a table with columns 'Field Name', 'Field Value', and 'Reset'.

	Field Name	Field Value	Reset
1	Messages	<input checked="" type="checkbox"/>	
2	Contacts	<input checked="" type="checkbox"/>	
3	Security	<input checked="" type="checkbox"/>	
4	Setup	<input checked="" type="checkbox"/>	
5	Group Setup	<input checked="" type="checkbox"/>	
6	My Info	<input checked="" type="checkbox"/>	
7	Recent Calls	<input checked="" type="checkbox"/>	
8	Shortcuts	<input type="checkbox"/>	
9	Networks	<input checked="" type="checkbox"/>	
10	Packet data	<input checked="" type="checkbox"/>	

The Configurable Menu Tree (CMT) feature allows the user to define which menu entries to be visible on the radio menu when in operation to ensure easy access to critical or needed features. The menu item will only be visible on the radio menu if the checkbox is switched on (enabled).

Note: If the main menu item is disabled, all sub menu items under it are automatically disabled.

24 TalkGroups



This menu contains the TMO, DMO and My Favorite Groups sub menus that have the following options:

24.1 TMO (Trunked Mode Operation)



TMO has the following sub menu options:

- TMO Folders List
- TMO Talkgroup List
- TMO Scan Lists
- Dynamic group Number Assignment

Related fields are:

Paragraph 22.1 "Hot Mic"

Paragraph 18 "TMO Voice Services"

24.1.1 TMO Folders List

	Name	Status	Transmission Timeout Timer, sec	Transmission Timeout Warning Timer, sec	Number of Talkgroups in the Range	Receive Only
TMO Folders List	Folder 1	<input checked="" type="checkbox"/>	60	50	16	<input type="checkbox"/>
TMO Talkgroup List		<input type="checkbox"/>	0	0	0	<input type="checkbox"/>
TMO Scan Lists		<input type="checkbox"/>				<input type="checkbox"/>

The TMO Folders List is more flexible and can have up to 256 ranges entered in this list to accommodate the 2048 Talkgroup entries now available in the TMO Talkgroup List.

24.1.1.1 Name

This field can be programmed with up to 12 alphanumeric digits for the name/alias of the range.

24.1.1.2 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.

24.1.1.3 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.

24.1.1.4 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.

24.1.1.5 Number of Talkgroups in Range

This field value is used to define the number of available Talkgroup entries for an individual range and is programmable from 0 to 2048, in other words there can be one range list with 2048 entries, or 256 ranges each with 8 Talkgroup entries.

24.1.1.6 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 be able to set up group calls to any of the talkgroups in the range, or PTT when listening to a call.

Related fields are:

Paragraph 18.3 "Scanning Parameters"

Paragraph 24.1.4 "TMO Scan Lists"

24.1.2 TMO Talkgroup List

Name	ID	Status	Folders List	Annou nce Group	Start Announce Call	Associated Announce Group	Group Priority	GCK Number	DMO
Test Group	8388609	Programmed	1: Folder 1	<input type="checkbox"/>	<input type="checkbox"/>		Low	65536	1: DMO TG
	0	Not Programm	1: Folder 1	<input type="checkbox"/>	<input type="checkbox"/>			65536	
	0	Not Programm	1: Folder 1	<input type="checkbox"/>	<input type="checkbox"/>			65536	1: DMO TG

Note: At least one entry field must remain empty if DGNA is to be used, see Chapter 2 of the Product Information Manual, Paragraph "Dynamic Group Number Assignment (DGNA)".

24.1.2.1 Name

This field can be programmed with up to 12 alphanumeric digits for the name/alias of the group.

24.1.2.2 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.

24.1.2.3 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.

24.1.2.4 Folders List

This field is automatically filled from the information in the TMO Range List and displays the active Ranges by list number and name against each of the available 2048 talkgroup entries in the range.

24.1.2.5 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. See Chapter 2 of the Product Information Manual, Paragraph "Announcement TalkGroup (ATG)" for more information. Select the check box to enable this option.

24.1.2.6 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.

24.1.2.7 Associated Announce Group

If the talkgroup is not an ATG (announce talkgroup), this field indicates to which ATG the talkgroup is assigned.

In the above screen shot 1900 is the 'Announce Group' and can start an 'Announce Call'.

Groups 1901 and 1902 have been associated with group 1900. When ever a call is made on group 1900, the other two groups will be included in the call.

24.1.2.8 Group Priority

The entry in this field determines the priority that the talkgroup will be scanned.

The five available options are:

- <Empty>
- Low
- Medium
- High
- Always Scanned

Related fields are:

Paragraph 18.3 "Scanning Parameters"

Paragraph 24.1.2.8 "Group Priority"

24.1.3 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 0-65536.

24.1.3.1 DMO Mapping

Status	Folders List	Annou nce Group	Start Announce Call	Associated Announce Group	Group Priority	GCK Number	DMO Mapping	Indexed
ammed	1: Folder 1	<input type="checkbox"/>	<input type="checkbox"/>		Low	65536	1: DMO TG 1 : DMO Folder1	53687091
rogramm	1: Folder 1	<input type="checkbox"/>	<input type="checkbox"/>			65536		0
rogramm	1: Folder 1	<input type="checkbox"/>	<input type="checkbox"/>			65536	1: DMO TG 1 : DMO Folder1	0

This field associates a Direct Mode Operation (DMO) group with a TMO group, so that if DMO is selected when active on this TMO talkgroup, the associated DMO talkgroup is automatically selected to be the active talkgroup on entering DMO.

24.1.3.2 Indexed

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.

24.1.4 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.

24.1.4.1 Scan List 1

- **Attributes**

	Field Name	Field Value	Reset
1	Name	Scan List1	
2	Status	<input checked="" type="checkbox"/>	

- **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**

	Talkgroup	priority
1	1: Test Group : Folder 1	
2		
3	1: Test Group : Folder 1	

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.

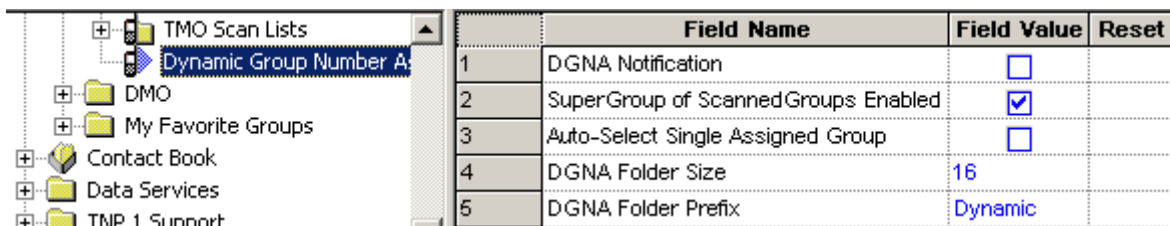
- **Priority**

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:

- None
- Low
- Medium
- High

24.1.5 Dynamic Group Number Assignment



	Field Name	Field Value	Reset
1	DGNA Notification	<input type="checkbox"/>	
2	SuperGroup of Scanned Groups Enabled	<input checked="" type="checkbox"/>	
3	Auto-Select Single Assigned Group	<input type="checkbox"/>	
4	DGNA Folder Size	16	
5	DGNA Folder Prefix	Dynamic	

This has the following 5 options:

24.1.5.1 DGNA Notification

Check the box to enable this feature. Enabling this feature allows the user to see messages related to DGNA operation, for example Group added or Group deleted.

24.1.5.2 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.

24.1.5.3 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 DFACILITY 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 still currently the selected group, the terminal shall automatically reselect the group previously selected explicitly by the user. However, if the user manually changed the selected group after auto-select and then subsequently reselects the auto-select group, or if there was never a user-selected group, the behaviour on de-assign of the group shall be as the behaviour with any other group.

No Auto-select with Multiple Groups

If the terminal receives an appropriate PDU containing DGNA assignments for more than one group, it shall be treated as a normal DGNA assignment, and the auto-select parameter shall 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' as defined, the terminal shall not auto-select the group.

Assign of 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 shall update the name of the non-tactical group with the group name received in the assignment. The terminal shall 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 of Non-tactical Emergency Group

If a de-assignment for the group that is defined as the non-tactical Emergency group is received, the terminal shall remove it from the talkgroup list if it is also defined there, but it shall 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 shall be accepted as normal, but auto-select shall not be

performed. Upon exiting from Emergency Mode, the terminal shall select (and attach to) the last auto-select group received.

Auto-select Display

There shall be a visible and audible notification to the user when auto select group is assigned or de-assigned, even if DGNA is disabled.

24.1.5.4 DGNA Folder Size

This defines how many entries can be placed into the folder. It can contain from 1 to 2048 entries.

24.1.5.5 DGNA Folder Prefix

This can contain up to 8 digits as a prefix (name) for the folder.

24.2 DMO (Direct Mode Operation)



Related fields are:

Paragraph 22.1 "Hot Mic"

Paragraph 19 "DMO Parameters"

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:

24.2.1 DMO Folders List

	Name	Status	Transmission Timeout Timer, sec	Transmission Timeout Warning	Number of Talkgroup	Receive Only
1	DMO Folder1	<input checked="" type="checkbox"/>	60	50	16	<input type="checkbox"/>
2		<input type="checkbox"/>	0	0	0	<input type="checkbox"/>
3		<input type="checkbox"/>	0	0	0	<input type="checkbox"/>

The DMO Folders List and the TMO range list have the same functionality.

The DMO Folders List can have up to 128 entries.

24.2.1.1 Number of Talkgroups in Range

This Field Value is used to define the number of available Talkgroup entries for an individual range and is programmable from 0 to 1024, in other words there can be one range list with 1024 entries, or 256 ranges each with 4 Talkgroup entries.

For more information see:

Paragraph 24.1.1 "TMO Folders List"

24.2.2 DMO Talkgroup List

The list can contain up to 1024 entries and each entry has up to 12 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 24.1.2 "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
DMO TG 1	8388609	<input checked="" type="checkbox"/>	1: DMO Folder	Direct	None		420.12500	User Defin
	0	<input type="checkbox"/>	1: DMO Folder	Direct	None		390.00000	User Defin
	0	<input type="checkbox"/>	1: DMO Folder	Direct	None		390.00000	User Defin

Receive Call to DMO Partnership Networks	Network MCC	Network MNC	TMO Mapping	Key Group	Incoming Call Minimum Security Class	Outgoing Call Security Class
User Defin	753	2361	1: Test Group : Fo	NO_KG	Security Class 1	Security Class 1
User Defin	0	0		NO_KG	Security Class 1	Security Class 1
User Defin	0	0		NO_KG	Security Class 1	Security Class 1

24.2.2.1 Communication Type

	ID	Status	DMO Folders List	Communication Type	Gateway Selection	Gateway Address	Frequency Channel
1	8388609	<input checked="" type="checkbox"/>	1: DMO Folder	Direct	None		420.12500
2	0	<input type="checkbox"/>	1: DMO Folder	Direct			390.00000
3	0	<input type="checkbox"/>	1: DMO Folder	Repeater			390.00000
4	0	<input type="checkbox"/>	1: DMO Folder	Gateway			390.00000
5	0	<input type="checkbox"/>	1: DMO Folder	Gateway & Repeater			390.00000

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.

24.2.2.2 Gateway Selection

DMO Folders List	Communication Type	Gateway Selection	Gateway Address	Frequency Channel
1: DMO Folder1	Gateway	Automatic		420.12500
1: DMO Folder1	Direct	None		390.00000
1: DMO Folder1	Direct	Specific		390.00000
1: DMO Folder1	Direct	Automatic		390.00000

This defaults to 'None' unless the Feature Flags/DMO Gateway option is selected, see Paragraph 14.18 "DMO Gateway" and Paragraph 24.2.2.1 "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.

24.2.2.3 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, that is Tx & Rx.

24.2.2.4 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.

24.2.2.5 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:
 - SSIRCVD equals the group MNI, or
 - 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.

24.2.2.6 Network MCC

This field defines the country code of the DMO Gateway.

24.2.2.7 Network NMC

This field defines the network code of the DMO Gateway.

24.2.2.8 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.

24.2.2.9 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 KG_j (j=1...K) or NO_KG.

24.2.2.10 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.

24.2.2.11 Incoming Call Minimum Security Class

Specifies the minimum security class for call initiation.

See “Incoming Call Minimum Security Class” on page 109.

24.3 My Favorite Groups



This menu has the following two sub-menus:

24.3.1 List Options

	Field Name	Field Value	Reset
1	Name for List of Favorite Groups	My Groups	
2	Max Number of Talkgroups in "My Favorite Groups"	128	
3	"My Favorite Groups" Edit	<input checked="" type="checkbox"/>	
4	"My Favorite Groups" Erase All	<input checked="" type="checkbox"/>	

This has the following options:

24.3.1.1 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.

24.3.1.2 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.

24.3.1.3 “My Favorite Groups” Edit

Selecting this option allows user to add groups to the list.

24.3.1.4 “My Favorite Groups” Erase All

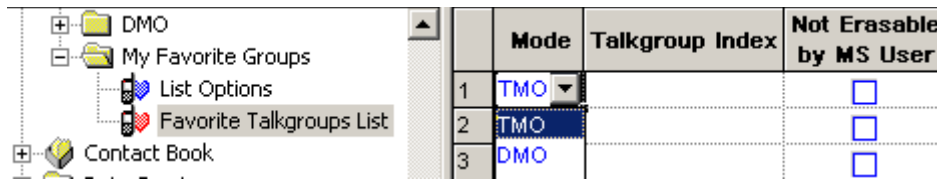
Selecting this option allows the user to remove groups from the list.

24.3.2 Favorite Talkgroups List

	Mode	Talkgroup Index	Not Erasable by MS User
1	TMO		<input type="checkbox"/>
2	TMO		<input type="checkbox"/>

This list can have up to 128 entries with the following three options:

24.3.2.1 Mode



	Mode	Talkgroup Index	Not Erasable by MS User
1	TMO		<input type="checkbox"/>
2	TMO		<input type="checkbox"/>
3	DMO		<input type="checkbox"/>

This field defines from which talk group list the entry is taken, the options are either TMO or DMO.

24.3.2.2 Talkgroup Index

	Mode	Talkgroup Index	Not Erasable by MS User
1	TMO	1: Test Group : F	<input type="checkbox"/>
2	TMO		<input type="checkbox"/>
3	TMO	1: Test Group : Folder 1	<input type="checkbox"/>
4	TMO		<input type="checkbox"/>

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.

24.3.2.3 Not Erasable by MS User

Checking the box in this field prevents the user from erasing the entry.

25 Contact Book



This has the following two sub-menus:

- Dialing Scheme
- Contact List

25.1 Contact List

Name	Status	Private	End-to-End Encryption Mode	Home	Speed Dial	Mobile	Speed Dial	Work	Speed Dial	PABX	Speed Dial
	<input type="checkbox"/>		<input type="checkbox"/>		0		0		0		0
	<input type="checkbox"/>		<input type="checkbox"/>		0		0		0		0
	<input type="checkbox"/>		<input type="checkbox"/>		0		0		0		0

Private	End-to-End Encryption Mode	Home	Speed Dial	Mobile	Speed Dial	Work	Speed Dial	PABX	Speed Dial	Other	Speed Dial
	<input type="checkbox"/>		0		0		0		0		0
	<input type="checkbox"/>		0		0		0		0		0
	<input type="checkbox"/>		0		0		0		0		0

This is a comprehensive list that may contain up to 1000 contacts. Each list entry can have multiple entries for private, phone (PSTN, PABX & mobile) numbers. Entries can either be entered manually or a predefined list can be imported using the 'File\Import\ User Data option'.

Note: Both the Semi-duplex Private Call and Private Duplex Call options in 'Feature Flags' must be enabled, otherwise not all the feature options will be available to the user.

The list is numbered 1 to 1000 and has the following editable columns:

25.1.1 Name

This field can contain a 12 digit alphanumeric name or alias identity of the 'Contact'.

25.1.2 Status

Select the check box to make an entry active. If an entry is not checked, it will not be displayed. This makes programming easier when the list is imported. Instead of manually entering the ISSIs and leaving out the terminal's own ID, the list can be imported and the terminal's own ISSI can be left unchecked.

25.1.3 Private

This entry is for the ISSI of the contacts terminal

25.1.4 Home, Mobile, Work, PABX and Other

These self explanatory list fields are used for storing all numbers associated with each contact. A number of up to 24 digits in the range 0 to 9, *, # can be entered in this field.

26 Data Services



This menu is used to set up the

- Outgoing mail parameters,
- Status ID list,
- Packet data parameters
- Short Data Service
- WAP, and
- PEI parameters.

26.1 Outgoing Mail Parameters



Related field is:

Paragraph 14.10 "Mail Out"

26.1.1 Outgoing Mail Options



26.1.1.1 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.

26.1.2 Outgoing Mail List

	Template Type	Edit Type	Prompt ID	Prompt Text	Editable Text	Address	Edit Size	Code Scheme	Indexed
1	UserDefined	AlphaNumeric	0				0	UC2	0
2	UserDefined	AlphaNumeric	0				0	UC2	0
3	UserDefined	AlphaNumeric	0				0	UC2	0

This list may contain up to 100 entries made up of the following options:

26.1.2.1 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

26.1.2.2 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 (in other words routes it to some other destination). The field is enabled only if PreDefined is selected in the Type field.

26.1.2.3 Prompt Text

This field contains non-editable prompt text of up to 12 characters that will appear on the phone screen, for example "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.

26.1.2.4 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.

26.1.2.5 Code Scheme

Edit Size	Code Scheme	Indexed
0	UC2	0
0	LATIN1_8_BITS	
0	UC2	
0	UC2	0

There are two available options:

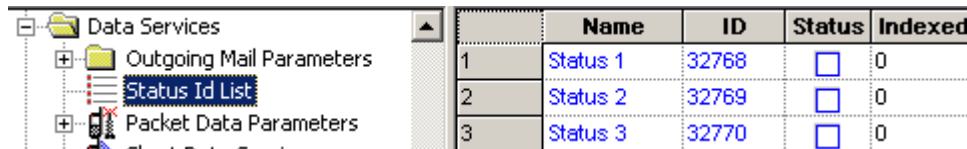
ASCII coding (LATIN1_8_BITS) scheme which is used by most western european languages.

UNICODE standard (UC2) which defines a consistent method of encoding/decoding multilingual text such as Chinese and Korean characters.

26.1.2.6 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.

26.2 Status ID List



	Name	ID	Status	Indexed
1	Status 1	32768	<input type="checkbox"/>	0
2	Status 2	32769	<input type="checkbox"/>	0
3	Status 3	32770	<input type="checkbox"/>	0

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:

26.2.1 Name

This field contains the alphanumeric message.

26.2.2 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.

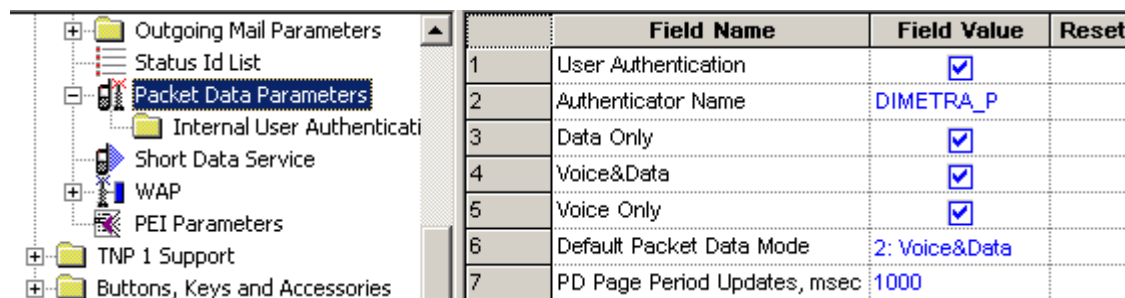
26.2.3 Status

Selecting the check box in this field will validate the message, allowing the user to see it when scrolling the list and send it.

26.2.4 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.

26.3 Packet Data Parameters



	Field Name	Field Value	Reset
1	User Authentication	<input checked="" type="checkbox"/>	
2	Authenticator Name	DIMETRA_P	
3	Data Only	<input checked="" type="checkbox"/>	
4	Voice&Data	<input checked="" type="checkbox"/>	
5	Voice Only	<input checked="" type="checkbox"/>	
6	Default Packet Data Mode	2: Voice&Data	
7	PD Page Period Updates, msec	1000	

The following entries define the operation of the terminal's packet data feature.

26.3.1 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"

26.3.2 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.

26.3.3 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.

26.3.4 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.

26.3.5 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.

26.3.6 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:

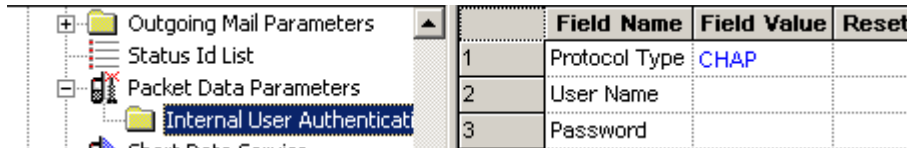
Paragraph 14.15 "Packet Data"

26.3.7 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.

26.3.7.1 Internal User Authentication



	Field Name	Field Value	Reset
1	Protocol Type	CHAP	
2	User Name		
3	Password		

- **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 the 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 the radio user during PPP connection setup.

Enter password in the text box with a choice of any characters.

26.4 Short Data Service (SDS)

	Field Name	Field Value	Reset
Subscriber Unit Parameters	1 Individual SDS L3 Status Ack	<input checked="" type="checkbox"/>	
Feature Flags	2 Group SDS L3 Status Ack	<input checked="" type="checkbox"/>	
Security	3 SDS Status Number of Retry	4	
End-to-End Encryption	4 Status Max	61439	
Remote Programming	5 Status Min	32768	
Clock System Broadcast Information	6 Send Short form Report	<input type="checkbox"/>	
TMO Voice Services	7 Access Priority	Low	
TMO Parameters	8 Traffic Stealing	<input type="checkbox"/>	
Ergonomic Parameters	9 AT Commands SDS-TL Access Priority	High	
Language Parameters	10 AT Commands SDS-TL Traffic Stealing	<input type="checkbox"/>	
Audio Parameters	11 Buffer Full, Overwrite Policy	Overwrite Only Old	
Display Parameters	12 DTR Link Down Indication Time, sec	1	Reset
TalkGroups	13 PI Concatenated Messages	240	
Contact Book	14 Support of Concatenated Text Messages	<input checked="" type="checkbox"/>	
Data Services	15 Segmented Receive Timer, sec	120	
Outgoing Mail Parameters	16 Long Text Message Length	500	
Status Id List	17 Store And Forward	<input checked="" type="checkbox"/>	
Packet Data Parameters	18 Number Of Service Center	000000000000000000000000	
Short Data Service	19 Default Validity Period	No Validity	
WAP	20 Group Call Notification While Composing SDS	<input checked="" type="checkbox"/>	
PEI Parameters	21 Mail Out During Group Call	Allowed	
TNP 1 Support	22 Status During Group Call	Allowed	
Buttons, Keys and Accessories	23 Default Data Russian Encoding Scheme	ISO-8895-5 Latin / Cyrillic (8-bit	
Mobility and System Parameters			
SPS			

The following menu options are used to set the terminal's configuration for sending Status Messages.

26.4.1 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.

26.4.2 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.

26.4.3 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.

26.4.4 Status Maximum

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.

26.4.5 Status Minimum

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.

26.4.6 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.

26.4.7 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.

26.4.8 Traffic Stealing

This is always associated with a traffic channel.

If enabled, the terminal will 'steal' part of a traffic channel's signalling capacity to pass the data as and when required.

26.4.9 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.

26.4.10 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'.

26.4.11 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.
- **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.

26.4.12 DTR Link Down Indication Time

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.

26.4.13 PI for 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.

26.4.14 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.

26.4.15 Segmented Receiver Timer

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.

26.4.16 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.

26.4.17 Store and Forward

This option is enabled/disabled by selecting the check box in this field. This option activates/deactivates the Message Service Center store & forward feature where the subscriber's outgoing messages are stored when recipients are not logged onto the system and forwarded when logged on.

Note: Not all systems support this feature.

26.4.18 Number of Service Centre

The number (address) of the Message Service Centre that is responsible for storing and forwarding the subscriber's outgoing messages is entered into this field. The address can be up to 25 digits

26.4.19 Default Validity Period

18	Number Of Service Center	00000000000000000000000000000000
19	Default Validity Period	No Validity
20	Group Call Notification While Composing SDS	No Validity
21	Mail Out During Group Call	10 sec
22	Status During Group Call	20 sec
23	Default Data Russian Encoding Scheme	30 sec
		40 sec
		50 sec
		60 sec

This field defines how long the outgoing message will be held by the message service centre in the event that the message cannot be delivered to the destination (a destination handset may be unavailable due to being out of coverage or switched off). To choose the period, place the pointer into the field value, click on the arrow, and drag the pointer to the desired period. Selecting "No validity" means that the Message Service Centre will not hold the undelivered message.

26.4.20 Group Call Notification while Composing SDS

Indicates if incoming group call display should be posted to user while composing SDS. If this field is disabled, the group call will only be heard without display notification.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

26.4.21 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.

26.4.22 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.

The default is set to 'Allowed'.

To select the option, put the pointer into the field value, click on the arrow.

26.4.23 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:

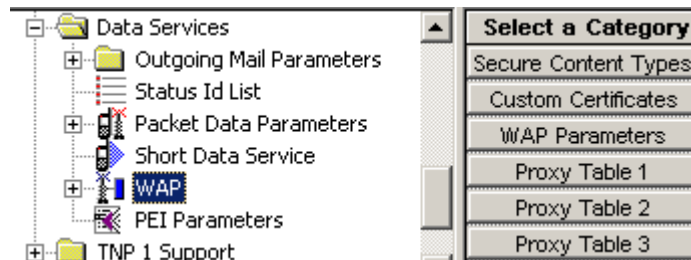
ISO-8895-5 Latin / Cyrillic (8-bit)

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.

26.5 WAP

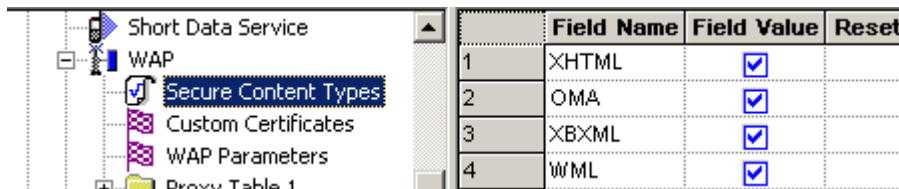


Related field is:

Paragraph 14.28 "WAP"

This feature has the following options:

26.5.1 Secure Content Types



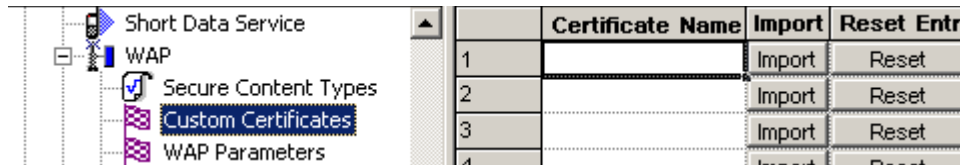
If the check box is enabled, the terminal will advertise to the WAP Gateway its willingness to accept the following MIME (Multipurpose Internet Mail Extensions) media type of the application category:

- **XHTML** (eXtensible HyperText Markup Language).

- **OMA** (Open Mobile Alliance).
- **WBXML** (WAP Binary XML).
- **WML** (Wireless Markup Language) Script.

By default all boxes are checked.

26.5.2 Custom Certificates



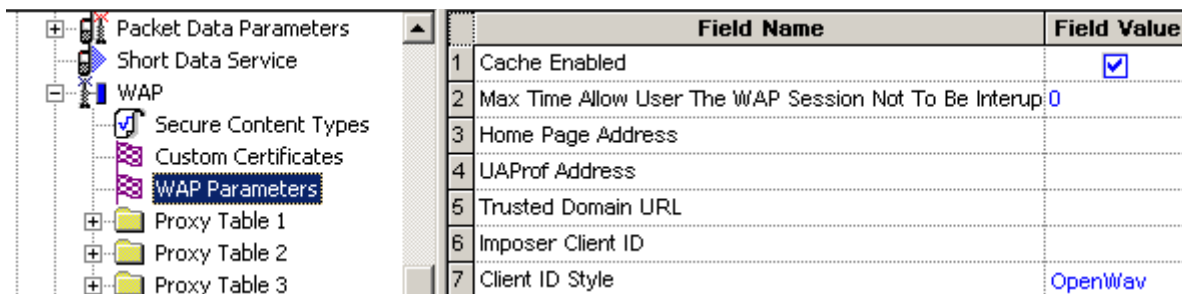
A terminal will be able to store up to TEN custom root certificates in the codeplug memory area, and add them to the terminal's set of built-in (default) root certificates.

A terminal will display readable information in the root certificates (default plus custom) stored in them.

The page shows:

- **Certificate Name:** enter the certificate name
- **Import** button: click this button to import the certificate.
- **Reset Entry** button: click this button to reset the Certificate Name field.

26.5.3 WAP Parameters

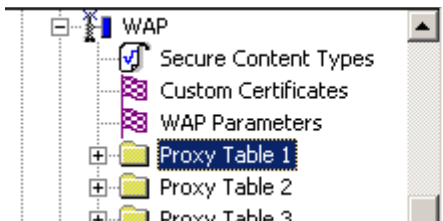


Below is a list of the WAP parameters.

- **Cache Enabled:**
If enabled, the following will be saved in the codeplug upon terminal's power down: cache, history, cookies, BAW (Basic Authentication Wallet) entries. Turn the check box on (Enable) or off (Disable) by clicking in the check box.
Default value: checked.
- **Maximum time allow user the WAP session not to be interrupted by calls:**
Indicates the period of time during which the user allows the terminal to be in data mode only, to let the browser fetch information without Group Call interruption. Type in the required value in seconds.
Default value: 0.

- Home Page Address:**
 Type in the URL of the Home Page for this terminal.
 Range: 128 ASCII.
- UAProf (User Agent Profile) Address:**
 The UAProf contains fields describing capabilities such as screen size, colour support, and so forth. The WAP Proxy may keep a scripted profile for a specific terminal. Type in the UAProf address for this terminal.
 Range: 128 ASCII.
- Trusted Domain URL:**
 Type in the URL of the trusted domain for this terminal.
 Range: 128 ASCII.
- Imposer Client ID:**
 The Client ID provides a means to identify a WAP client to the WAP Proxy. The Client ID may be assigned by the operator of a WAP proxy if the WAP Proxy does not support the WAP-TETRA Standard. The Client ID is provisioned into the terminal. Type in the required ID.
- Client ID style:**
 Defines the Client ID format. To change the setting, select the field value, then select desired setting.
 Default value: OpenWave.

26.5.4 Proxy Tables 1 to 3



	Field Name	Field Value	Reset
1	Proxy IP Address	0. 0. 0. 0	
2	Remote Port	0	
3	Force SAR	<input checked="" type="checkbox"/>	
4	SAR Group Size	3	
5	Bearer Index	0	

A Proxy is also called a Gateway.

The terminal must connect to the Internet via the Proxy.

To enable WAP operation, the operator should provide at least one Proxy.

Below is a list of Proxy parameters.

- Proxy IP Address:**
 This the IP address for the WAP Gateway. The terminal provides the user with means to select a Proxy from a list of Proxies. This enables users to change (if required) the active Proxy from secure to non-secure, or vice-versa, or choose different Proxies for various navigation purposes.
- Remote Port:**
 Type the relevant port number.
 - 9201 is non-secured.
 - 9203 is secured.
- Force SAR:**
 If enabled, the terminal will be capable of forcing the SAR (Segmentation and Reassembly)

on the WAP Proxy. Turn the check box on (Enable) or off (Disable) by clicking in the check box.

Default value: checked.

- **SAR Group Size:**

Type in the required SAR group size.

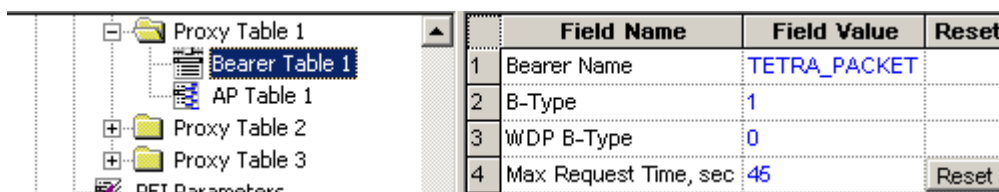
Default value: 3.

- **Bearer Index:**

The bearer interfaces between the terminal and the WAP Proxy. To change the setting, select the field value, then select desired setting.

Default value: 0. Do **NOT** change the default value.

26.5.4.1 Bearer Tables



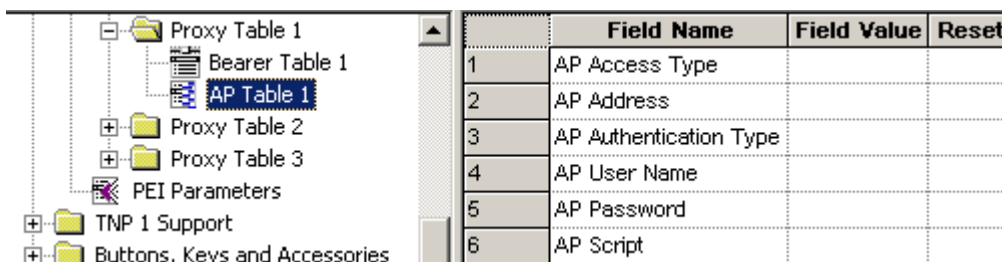
	Field Name	Field Value	Reset
1	Bearer Name	TETRA_PACKET	
2	B-Type	1	
3	WDP B-Type	0	
4	Max Request Time, sec	45	Reset

The terminal stores Proxy information. This information includes: the address of each Proxy, the bearer (or network) each Proxy uses, and the data connection (or Access Point) information for each bearer. The network uses this information to establish communication with the Proxy.

The terminal also creates a bearer (or network) table that contains information about the bearer for each Proxy: name, type, and maximum request time. The Client requires this information before initiating data communication.

Please consult with the Service Provider before filling up these tables.

26.5.4.2 AP (Access Point) Tables

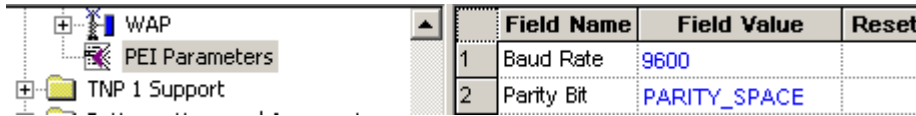


	Field Name	Field Value	Reset
1	AP Access Type		
2	AP Address		
3	AP Authentication Type		
4	AP User Name		
5	AP Password		
6	AP Script		

The terminal stores Proxy information. This information includes: the address of each Proxy, the bearer (or network) each Proxy uses, and the data connection (or Access Point) information for each bearer. The network uses this information to establish communication with the Proxy.

Please consult with the Service Provider before filling up these tables.

26.6 PEI Parameter



	Field Name	Field Value	Reset
1	Baud Rate	9600	
2	Parity Bit	PARITY_SPACE	

Lists the parameters related to the Peripheral Equipment Interface (PEI) feature.

26.6.1 Baud Rate

Selects the transmission rate at which data flows between DTE (for example computer) and DCE (that is 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.

26.6.2 Parity Bit

Determines whether an optional Parity Bit is used on serial communication between DTE (for example computer) and DCE (that is 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.

27 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:

27.1 Default Service Profile



	Field Name	Field Value	Reset
1	SDS Control [0]	Neither	
2	SDS Control [1]	MT-controlled	
3	SDS Control [2]	MT-controlled	

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 (for example 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.

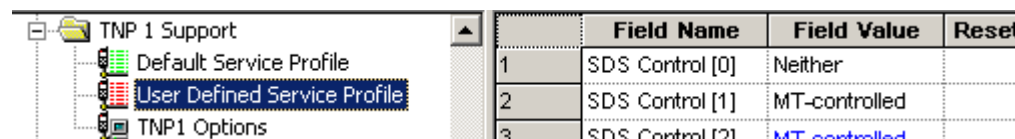
Each cell has the structure of information element "SDS (Short Data Service) Control".

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.

27.2 Default Service Profile

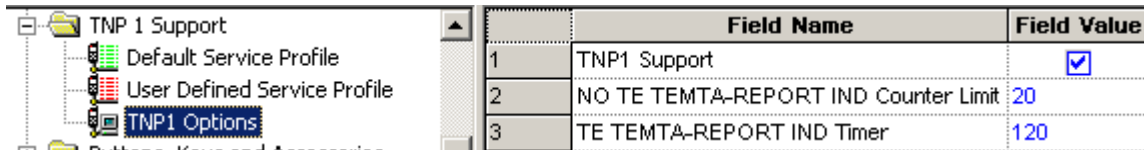


	Field Name	Field Value	Reset
1	SDS Control [0]	Neither	
2	SDS Control [1]	MT-controlled	
3	SDS Control [2]	MT-controlled	

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”.

27.3 TNP1 Options



	Field Name	Field Value
1	TNP1 Support	<input checked="" type="checkbox"/>
2	NO TE TEMTA-REPORT IND Counter Limit	20
3	TE TEMTA-REPORT IND Timer	120

This menu is used to set the button/key functionality and it has the following options:

27.3.1 TNP1 Support

The TNP1 feature operates only when Packet Data or External Device is enabled in the codeplug (for example: a PPP session with MT2 can be established).

Turn the check box (Enable) or off (Disable) by clicking in the check box.

27.3.2 NO TE TEMTA-REPORT IND Counter Limit

This is a Service Profile timer. MT2 terminates its PPP link with TE2 and resets to zero the NO TEMTA-REPORT IND counter when the counter reaches its maximum value.

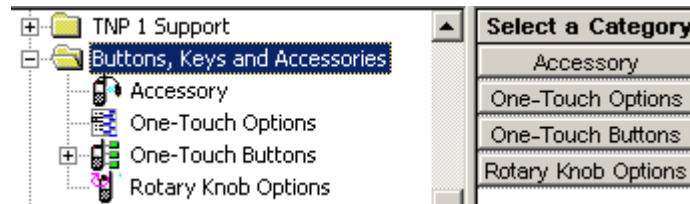
The range of this timer is 1 to 100.

27.3.3 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.

28 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:

28.1 Accessory

This menu has the following features:

28.1.1 Accessory Selection

	Field Name	Field Value	Reset
1	Accessory Sele	Headset/Cov	
2	Ring Source	Speaker Mic	
3	Tones Path Sele	Headset/Covert	

This field defines the type of accessory that will be used with the terminal, the options are:

- **Speaker Microphone.**
- **Headset/Covert**
- **Earpiece**

Related fields are:

Paragraph 14.11 "External Device"

Paragraph 20 "Ergonomic Parameters"

28.1.2 Ring Source

	Field Name	Field Value	Reset
1	Accessory Sele	Headset/Cov	
2	Ring Source	In Radio	
3	Tones Path Sele	In Radio	

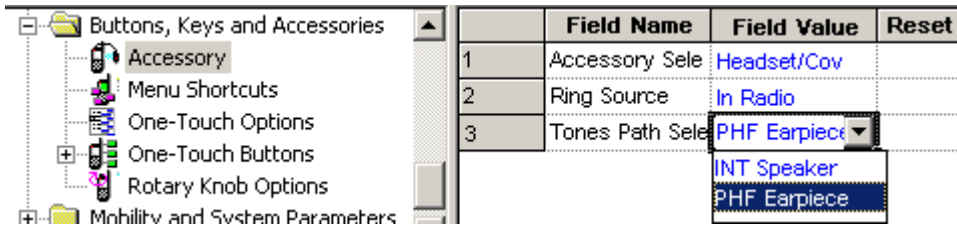
The available options with this feature defines where the ring tones will be heard, either from the accessory or from the terminal's internal loudspeaker.

Related fields are:

Paragraph 14.11 "External Device"

Paragraph 22 "Audio Settings"

28.1.3 Tones Path Selection for PHF Accessory in Idle Mode



This feature is used to select the active speaker for tone alerts when the terminal's PHF accessory (Personal Hands-free) is in idle mode.

By default the tones are heard in the PHF earpiece (speaker). However, it is possible to rout the tones to the internal speaker.

To select an option, put the pointer into the field value, click on the arrow, and drag the pointer to the desired option.

28.2 One-Touch Options

	Field Name	Field Value	Reset
1	One-Touch Keypad Keypress Timer, msec	1000	Reset
2	One-Touch Function Button Keypress Timer, msec	100	Reset

This menu is used to set the button/key functionality and it has the following options:

Related field is:

Paragraph 14.19 "One-Touch Feature"

28.2.1 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.

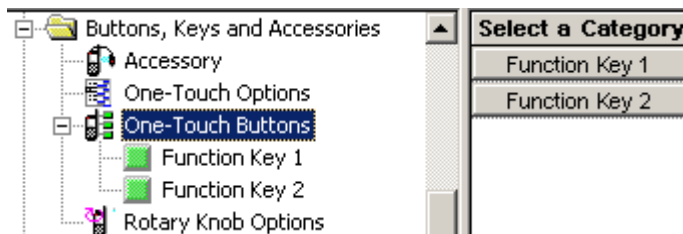
It has a range of 1000 to 5000 msecs, the default being 1000 msecs.

28.2.2 One Touch Function Button Keypress Timer

The entry in this field sets the time duration that a programmable **Side Button** must remain pressed before the one-touch functionality is activated.

It has a range of 10 to 5000 msecs, the default being 100 msecs.

28.3 One Touch Buttons



Related field is:

Paragraph 14.19 "One-Touch Feature"

This feature allows often used terminal features/options to be programmed to a button as a one touch button feature. The 'Feature Flag' menu options must be selected to see all available options.

To select the required button option, place the pointer into the 'Field Value', click on the down arrow, place the pointer on the required option and select the option by clicking the left mouse button. Once the option has been selected, more Field Names and Field Value entries will be displayed requiring more information for the selected option.

Note: The same option, but with different parameters, may be repeatedly assigned to different buttons, for example Sending Predefined Message - a different message would be assigned.

Apart from 'Unassigned', there are the following available options:

- Change Font Size
- Enable/Disable Howling Suppression
- Change Audio Profile
- Covert Mode
- Screen Saver Activation
- PABX call
- Phone call
- Private call
- TXI (Transmit Inhibit)
- Sending Predefined Message
- Sending User Defined Message
- Audio Profile
- Hi/Lo Audio
- Change Talkgroup
- Flip Display
- Sending Targeted Status
- Sending Status
- TMO <-> DMO Switch
- TMO Talkgroup Scan
- Backlight Adjustment

28.3.1 Change Font Size

If enabled, this will enable the terminal user to switch the font size via a one touch button press. The available settings are Normal, Zoom and Extra Zoom.

28.3.2 Enable/Disable Howling Suppression

If enabled, this will enable the terminal user to toggle the Howling Suppression (Paragraph 18.13.3 "Howling Suppression").

28.3.3 Change Audio Profile

If enabled, the terminal user can toggle through Audio Profiles (Paragraph 18.13.2 "Audio Profiles") via a one touch button press.

28.3.4 Screen Saver Activation

If enabled, this will enable the terminal user to enter the screen saver mode, via a one touch button press, to hide displayed terminal information.

28.3.5 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.

28.3.6 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.

28.3.7 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.

28.3.7.1 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.

28.3.7.2 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.

28.3.8 TXI (Transmit Inhibit)

When this option is chosen, the following fields are enabled:

28.3.8.1 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.

28.3.8.2 Deactivate

When TXI is disabled, the terminal can send a status message informing the dispatcher that it is now in normal operating mode. The status message number is manually entered into this field and is not selectable from the Status List entries.

28.3.8.3 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 msec and the default is 500 msec.

28.3.8.4 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 msec and the default is 2000 msec.

28.3.8.5 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.

28.3.9 Sending Predefined Message

This function sends a predefined message to the address that is already stored in the codeplug.

28.3.9.1 Select Message

Choose a message from a list. The list will include all the predefined messages that appear in the message list in the CPS.

Related field is:

Paragraph 26.1.2 "Outgoing Mail List"

Note: Sending Predefined Message is only available if the appropriate values are set in the Outgoing Mail List.

28.3.10 Sending User Defined Message

This function sends a message the user chose from the Templates list in the terminal.

Note: Sending User Defined Message is only available if the appropriate values are set in the Outgoing Mail List.

28.3.10.1 Select Message

Choose a message from a list. The list will include all the user defined messages that appear in the message list in the CPS.

Related field is:

Paragraph 26.1.2 "Outgoing Mail List"

28.3.10.2 Send to

Insert the destination ID number (only a valid ISSI will be accepted); or, the user will be able to enter the address in the terminal while sending the message.

Default value: 0; The user will be asked to insert the address.

28.3.11 Hi/Lo Audio

This function changes the speaker between Speaker: On/Speaker: Off.

28.3.12 Change Talkgroup

This option enables fast selection of a predefined talkgroup and different talkgroups may be assigned to different buttons.

28.3.13 Flip Display

This option enables the contents of the display to be flipped upside down. The feature is particularly useful for a user who has to wear the terminal on shoulder, belt, or lapel and at the same time wishes to read the display upside down.

28.3.14 Sending Targeted Status

Related field:

Paragraph 14.3 "Targeted Status"

28.3.14.1 Status Target Type

This field is non editable and is set for Private.

28.3.14.2 Address Type

This field is non editable and is set for 'Sort Subscriber Identity (ISSI)

28.3.14.3 Send To

Enter the address to which the status message will be sent.

28.3.14.4 Status ID

Click on the Field Value box to display the down arrow and select the required message.

28.3.15 Sending Status

This option allows the user to send a specific status message to a specific talkgroup. This option has the following two editable fields:

Related field:

Paragraph 14.2 "Status"

28.3.15.1 Send To

This is the GSSI for the group to which the status message will be sent. Place the pointer into the 'Field Value', click on the down arrow to display the Contact Book \ TMO \ TMO Talkgroup List. Place the pointer on the required option and select it by clicking the left mouse button. The selected talkgroup with its associated ID and list position will now be entered into this field.

28.3.15.2 Status ID

Place the pointer into the 'Field Value', click on the down arrow to display the Data Services \ Status ID List. Place the pointer on the required option and select it by clicking the left mouse button. The selected message with its associated ID and list position will now be entered into this field.

28.3.16 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.

28.3.17 TMO Talkgroup Scan

This one touch option is used to enable/disable talkgroup scan.

Related field is:

Paragraph 14.14 "Talkgroup Scan"

28.3.18 Backlight Adjustment

This option allows different backlight functionality to be programmed to different buttons. This option has the same available parameters as the Display Parameters \ Display Options.

Related field is:

Paragraph 23.1 "Display Options".

28.4 Rotary Knob Options

	Field Name	Field Value	Reset
1	Rotary Knob Mode	Dual	
2	Rotary Switch Lock	<input checked="" type="checkbox"/>	
3	Rotary Switch Confirm Group Selection	<input type="checkbox"/>	
4	Rotary Knob Switch Timer,msec	7000	Reset
5	Push Button Long Timer,msec	1000	Reset
6	End-Stop Rotary Group Scrolling	<input checked="" type="checkbox"/>	

The menu has the following programmable features that cater for the dual functionality of the rotary switch. The rotary switch can be used to scroll all available lists and, or to adjust the audio volume.

Normal rotation will adjust the volume, this is also the default in dual mode. Pressing the switch knob down will select the 'List Mode', release the knob, then rotate it to scroll the list. The list being scrolled is dependent upon which mode the terminal is in, for example Private Call Mode, the button will scroll the Private Call list; Group Mode, the button will scroll the available Talkgroups in all available ranges.

There are two methods for returning to the normal volume operation mode and this is dependent upon the Rotary Switch Knob Timer. If set to zero, the user must manually switch back to normal volume operation by again pressing the Rotary Control Knob, otherwise with a time set, the terminal will automatically return to normal volume operation after this time period.

There are 3 choices associated with this option, click on the down arrow and select the required option.

28.4.1 Rotary Knob Mode

This has the following selectable options:

	Field Name	Field Value	Reset
1	Rotary Knob Mode	Dual	
2	Rotary Switch Lock	Dual	
3	Rotary Switch Confirm Group Selection	Volume	
4	Rotary Knob Switch Timer,msec	List	Reset
5	Push Button Long Timer,msec	1000	Reset
6	End-Stop Rotary Group Scrolling	<input checked="" type="checkbox"/>	

28.4.1.1 Dual

In this mode the rotary control has dual functionality:

- Rotate the control to set the required audio level (volume), this is the default operation.
- Press the control down, then rotate the control to scroll the list associated with the terminal's current operational mode.

28.4.1.2 Volume

If this option is chosen, the rotary control will have only this 1 function for setting the required audio level (volume).

28.4.1.3 Lists

If this option is chosen, the rotary control will have only this 1 function and is used for scrolling any list.

28.4.2 Rotary Switch Lock

If selected, then on release of the control, the selected option is chosen automatically. If this is not checked, the user must select the chosen option using the option button below the displayed 'OK'.

28.4.3 Rotary Switch Confirm Group Selection

If selected, the terminal will confirm the group selection with an audio alert.

28.4.4 Rotary Knob Switch Timer

This defines the time after no activity, when the terminal will action the selected option. If set correctly, it will allow the user to visually check that the correct option has been chosen.

The range for this timer is 0 & 1000 - 60,000 msecs and the default setting is 7,000 msecs.

28.4.5 Push Button Long Timer

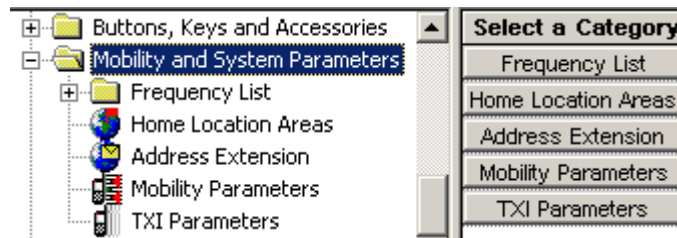
Indicates the minimum period of time after which pushing the push button of the rotary knob is considered as a long push. Long Push is used only for locking and unlocking the knob, and knob release always moves to the default mode.

The range for this timer is 1,000 to 5,000 msecs and the default value is 1,000 msecs.

28.4.6 End Stop Rotary Group Scrolling

If the terminal has been programmed for Range Scroll Type/Scroll Stay in Range, the user will be given an indication when the end of the range list has been reached and the user must scroll back to select another group.

29 Mobility and System Parameters



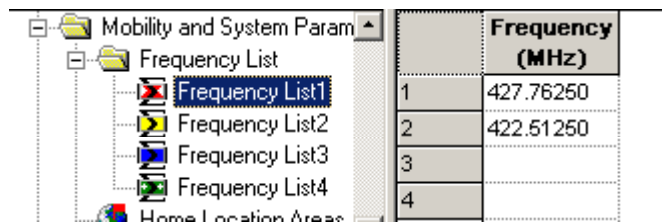
These menus are used for programming the terminal with the necessary system parameters that will enable the terminal to work on the system.

This contains the following menus, of which the Frequency List menu has several sub menus.

29.1 Frequency List

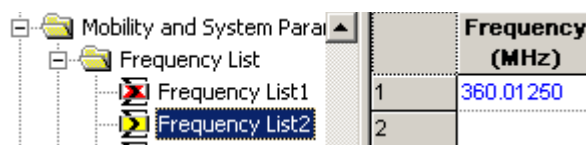
This contains the following four frequency lists:

29.1.1 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.

29.1.2 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.

29.1.3 Frequency List 3

	Field Name	Field Value	Reset
1	First Frequency to Scan	360.01250	
2	Number of Frequencies	400	

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.

29.1.3.1 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.

29.1.3.2 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.

29.1.4 Frequency List 4

	Field Name	Field Value	Reset
1	First Frequency to Scan		
2	Number of Frequencies	0	

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.

29.2 Home Location Areas

	Field Name	Field Value	Reset
1	Number of Home Location Areas	0	
2	Home Location Area	Collapse	
3		0 0	
4		1 0	
5		2 0	
6		3 0	

These two has two options that define the system cells to which the terminal may roam and operate.

29.2.1 Number of Home Location Areas

The number in this field is automatically entered by the CPS after the Home Location Areas have been defined.

29.2.2 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.

29.3 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:

29.3.1 Country Code (MCC)

This is the country code of the system

29.3.2 Network Code (MNC)

This is the systems unique ID

Note: The MCC and MNC are provided by the in country licensing authority.

29.3.3 Alias

This is the name or alias of the system and can be a maximum of 11 characters.

29.4 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	<input checked="" type="checkbox"/>	
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.

29.4.1 Minimum 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.

29.4.2 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,

29.4.3 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.

29.4.4 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.

29.4.5 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.

29.4.6 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.

29.4.7 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.

29.5 TXI Parameters (Transmit Inhibit)

	Field Name	Field Value	Reset
1	Activate	65264	Reset
2	Deactivate	65265	Reset
3	TXI Activation Timer, sec	15	Reset
4	TXI Mode Started Timer, msec	500	Reset
5	TXI Mode Cancel Timer, msec	2000	Reset

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, (for example hospitals, airplanes, and so forth), 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 28.3.8 "TXI (Transmit Inhibit)". 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:

29.5.1 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.

29.5.2 Deactivate

When TXI is disabled, the terminal can send a status message informing the dispatcher that it is now in normal operating mode. The status message number is manually entered into this field and is not selectable from the Status List entries.

29.5.3 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.

29.5.4 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 msec and the default is 500 msec.

29.5.5 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 msec and the default is 2000 msec.

30 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 and so forth.

The GPS 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.

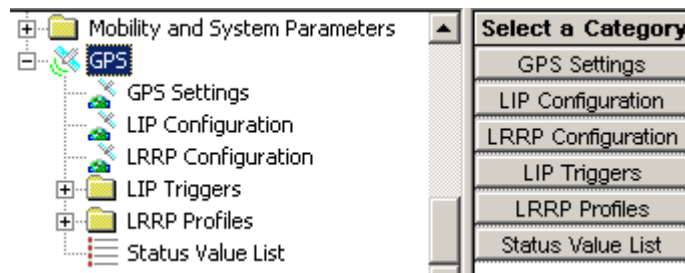
The reports are sent using a proprietary protocol, via the SDS transport layer, that also flags error conditions.

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%.



30.1 GPS Settings

	Field Name	Field Value
1	Current GPS Cycle	1
2	Leap Seconds	14
3	Enable GPS via MMI	<input type="checkbox"/>
4	Testpage on the MMI Enable	<input type="checkbox"/>
5	Beep for GPS Coverage	<input checked="" type="checkbox"/>
6	Icon for GPS Coverage	<input checked="" type="checkbox"/>
7	GPS Authorised ISSI Base	0
8	GPS Authorised ISSI Range	0
9	GPS Coverage Poll Period	180
10	Preferred Position Calculation Mode if DCK is Off	Power Optimized
11	MMI Accuracy Menu Enabled	<input checked="" type="checkbox"/>
12	Accuracy Mode Switching Enabled	<input type="checkbox"/>
13	High Accuracy Mode On Emergency	<input type="checkbox"/>
14	GPS Location Protocol	LRRP

30.1.1 Current GPS Cycle

This parameter Indicates the current GPS cycle.

Each 1024 weeks (starting from 1980/01/06) the GPS Week number rolls-over the 1024 border and re-starts again with 0. That means that around each approximately 19,85 years a roll-over appears. The first GPS cycle was from 1980/01/06 to 1999/08/21. The second GPS cycle starts on 1999/08/22 and runs currently until 2019.

For the current time from 22.Aug.1999 until 2019 the GPS cycle "1" would be typed in.

30.1.2 Leap Seconds

This parameter specifies the difference between GPS time and UTC Time. The parameter is used to synchronize both time systems in the terminal.

30.1.3 Enable GPS via MMI

This parameter enables/disables GPS MMI (Man Machine Interface):

- If enabled, the terminal provides an MMI interface by means of which the user can change the GPS settings (disabling/enabling Location Services).
- If disabled, the terminal does NOT provide any means by which the user can change the GPS settings. The user cannot disable or enable Location Services.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

30.1.4 Test Page on the MMI Enable

This parameter enables/disables the test page availability through MMI (Man Machine Interface).

- If enabled, the terminal provides an MMI by means of which the terminal's user can view the detailed GPS information.
- If disabled, the terminal does NOT provide any means by which the terminal's user can view the detailed GPS information.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

30.1.5 Beep for GPS Coverage

If the parameter is enabled, the GPS Coverage audio indications are enabled in the terminal.
If the parameter is disabled, the GPS Coverage audio indications are disabled in the terminal.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

30.1.6 Icon for GPS Coverage

If the parameter is enabled, the GPS Coverage visual indications are enabled in the terminal.
If the parameter is disabled, the GPS Coverage visual indications are disabled in the terminal.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

30.1.7 GPS Authorised ISSI Base

This ISSI is the first in the range of ISSIs acceptable as authorized. (When receiving location service requests, the terminal checks the calling party ISSI of downlink location service requests.)

The range is any valid ISSI, or the NO ISSI reserved value. (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 first valid ISSI.

30.1.8 GPS Authorised ISSI Range

This parameter defines the range (or offset) of authorised ISSIs - start from "GPS Authorized ISSI Base".

Type in the range/offset for the last valid ISSI.

30.1.9 GPS Coverage Poll Period

This number is the period (in seconds) in which the GPS Coverage is checked when out of GPS coverage and the GPS icon is updated accordingly.

Type in (in seconds) how often the GPS Coverage should be checked.

30.1.10 Preferred Position Calculation Mode if DCK is Off

When DCK (Digital Car Kit) is off, the radio has only its own battery as power source. This means normally all hardware works in power save mode if possible. But, it is also possible to get more exact position data, even when DCK is off.

This leads to high power consuming of the GPS related hardware, because it then works in the same mode as it would be in "DCK on" status.

The battery will then be empty earlier when this mode is active.

This parameter allows user to configure the terminal to deliver more (and more exact) position data even when DCK is off.

Therefore, the terminal works in a mode that is normally not used when DCK is off.

30.1.11 MMI Accuracy Menu

This field is used to store information on whether the terminal's user can see and use the GPS Accuracy menu or if it is hidden from him.

If this field is set to Enabled (field checked off), the terminal will show the GPS Accuracy menu to the user. The user can choose between two GPS tracking modes outside of a digital car kit (DCK) with

their own advantages (better position accuracy, less power optimised) and disadvantages (power optimised but less accuracy).

30.1.12 Accuracy Mode Switching Enabled

If this parameter is enabled, the terminal is able to switch to the High Accuracy mode on emergency and/or outgoing Status messages.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

30.1.13 High Accuracy Mode on Emergency

If this parameter is enabled, the terminal automatically switches to the High Accuracy Mode on emergency. The field "Accuracy Mode Switching Enabled" must also be checked.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

30.1.14 GPS Location Protocol

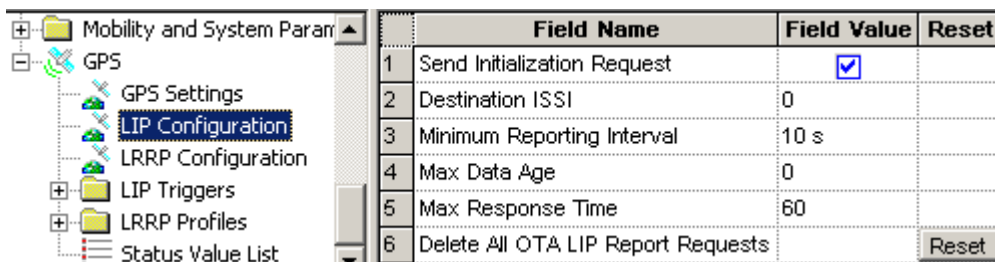
In this field you select the over-the air location protocol used for location requests and location reports.

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.

30.2 LIP Configuration



	Field Name	Field Value	Reset
1	Send Initialization Request	<input checked="" type="checkbox"/>	
2	Destination ISSI	0	
3	Minimum Reporting Interval	10 s	
4	Max Data Age	0	
5	Max Response Time	60	
6	Delete All OTA LIP Report Requests		Reset

30.2.1 Send Initialization Request

If enabled, the radio will send an Initialization Request after it is powered up and registered in the network. After the radio has sent the Initialization Request it expects a LOCATION REPORTING ENABLE/DISABLE REQUEST from the Location Server to configure its initial LIP settings (for example whether the radio is globally disabled or enabled for sending location reports). In case it does not receive an answer from the location server, the radio considers itself disabled for location reporting.

If this field is disabled the radio will not send an Initialization Request and considers itself enabled for location reporting.

Turn the check box on (Enable) or off (Disable) by clicking in the check box.

30.2.2 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.

Type in the required value.

30.2.3 Min Reporting Interval

Duration which is not underrun between 2 successive LIP location reports. This duration or interval provides a form of guarantee that the MS will ensure a minimum interval elapses between location reports to avoid flooding the air interface.

If the user desires to receive all location reports as soon as the reports are triggered, this duration should be set to a low value, for example 10 sec.

Type in the required value.

30.2.4 Max Data Age

This field specifies the acceptable maximum age of location data.

Type in the required value.

30.2.5 Max Response Time

This field specifies the maximum duration the GPS system has to acquire location data.

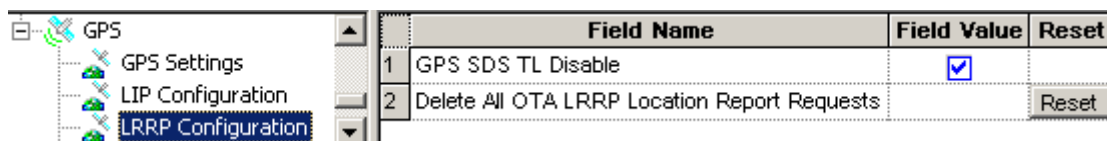
Type in the required value.

30.2.6 Delete All OTA LIP Location Report Requests

This field is responsible for removing all Over-the-Air (OTA) Location Information Protocol (LIP) report requests (triggered requests) received over the air. This is a clean up measure to delete orphaned requests that are no longer useful.

To clear all requests, press the Reset button.

30.3 LRRP Configuration



	Field Name	Field Value	Reset
1	GPS SDS TL Disable	<input checked="" type="checkbox"/>	
2	Delete All OTA LRRP Location Report Requests		Reset

30.3.1 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.

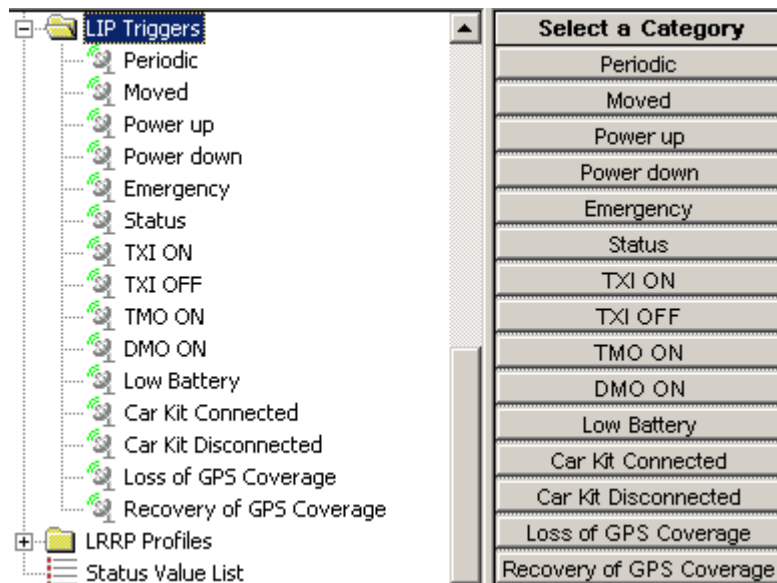
Note: We recommend the default setting (box checked) because the message over the air is shorter.

30.3.2 Delete All OTA LRRP Location Report Requests

This field is responsible for removing all Over-the-Air (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.

To clear all requests, press the Reset button.

30.4 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 (called the corresponding LIP Triggers).

If a triggered request has been received over the air, the report will be using the parameters sent over the air, so the pre-programmed values in CPS will not apply.

The triggers have some of the following settings:

Enabled

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.

Max Reporting Interval

This is the interval at which periodic Location Reports are sent.

Type in the value. This value will be mapped to an actual value as shown in the second column of the mapping table.

Max Data Age

Indicates the default maximum age allowed for data in Location Report message for triggered reports.

Type in the value. This value will be mapped to an actual value as shown in the second column of the mapping table.

Max Response Time

Specifies the maximum duration the GPS system has to acquire location data.

Type in the required value.

Max Report Distance

Defines the distance interval at which distance-based Location Reports are sent when not inserted in a Digital Car Kit.

Type in the required value.

Distance Check Interval

Maximum interval (in seconds) at which MS checks its position for position-based Location Reports when not inserted in a Digital Car Kit.

Type in the required value.

Low Battery Level

Indicates the percentage of battery level triggering the "Low Battery" condition.

Type in the required value.

30.4.1 Periodic

This is a periodic Location Reports sent by the terminal outside Emergency Mode.

While the terminal is not in Emergency Mode, and depending on the "Periodic" Trigger Enable settings, it will acquire its position and send periodic Location Reports at intervals defined by the GPS Idle Report Period (unless reports of that nature are inhibited, in which case it will do nothing).

Normal GPS periodic location reports are inhibited when the radio is in Emergency Mode. If GPS periodic location reports are required during Emergency Mode, then it is necessary to enable the Emergency Periodic reports.

30.4.2 Moved

At defined time intervals, the terminal checks its location against the last reported position, and sends a Location Report whenever the check shows the position has changed by the specified distance.

Note: A distance based location report is only sent if the distance between the measurement and the last reported position is higher than the distance threshold. The real moved distance could be higher (for example: coming back or going around the first point); also the change will not be reported when its time elapsed is less than the preset time period.

30.4.3 Powered up

When the terminal is powered up, and subject to the "Powered up" Trigger Enable settings, it will acquire its location and send a Location Report after performing the power up sequence.

30.4.4 Powered down

When the terminal is powered down, and subject to the "Powered down" Trigger Enable settings, it will acquire its location and send a Location Report before performing the power down sequence.

Note: The terminal will not necessarily succeed in transmitting the Location Report before it has to power off.

30.4.5 Emergency

Upon entry into the Emergency Mode, and depending on the "Emergency" Trigger Enable settings, the terminal will acquire its position and send a Location Report.

Note: This requirement does not imply that any other reports are inhibited during Emergency, so any other reports caused by other requirements will still be sent, including immediate requests over the air, delta distance, and so forth.

30.4.6 Status

If sending an outgoing Status message via the menu, the terminal shall acquire its location and send a Location Report, provided that some additional settings in Status Id List and GPS Status Value List are configured accordingly.

30.4.7 TXI ON

Immediately before entering Transmit Inhibit Mode, and subject to the "Transmit Inhibit Mode ON" Trigger Enable settings, the terminal will acquire its location and send a Location Report.

Note: This requirement will not cause an indefinite delay in entering Transmit Inhibit Mode, since the maximum acquisition time is specified.

Note: The lower layers of the protocol stack may lose the report, due to Transmit Inhibit Mode activation.

30.4.8 TXI OFF

Immediately after leaving Transmit Inhibit Mode, and subject to the "Transmit Inhibit Mode OFF" Trigger Enable settings, the terminal will acquire its location and send a Location Report.

30.4.9 TMO ON

Immediately after entering TMO, and subject to the "TMO ON" Trigger Enable settings, the terminal will acquire its location and send a Location Report.

30.4.10 DMO ON

Immediately before entering DMO, and subject to the "DMO ON" Trigger Enable settings, the terminal will acquire its location and send a Location Report.

30.4.11 Low Battery

When the terminal battery level is low, and subject to the "Low Battery" Trigger Enable settings, it will acquire the location of the terminal and send a Location Report.

30.4.12 Car Kit Connected

Immediately after connection to the Digital Car Kit (DCK), and subject to the "Car Kit Connected" Trigger Enable settings, the terminal will acquire its location and send a Location Report.

30.4.13 Car Kit Disconnected

Immediately after disconnection from the Digital Car Kit (DCK), and subject to the "Car Kit Disconnected" Trigger Enable settings, the radio will acquire its location and send a Location Report.

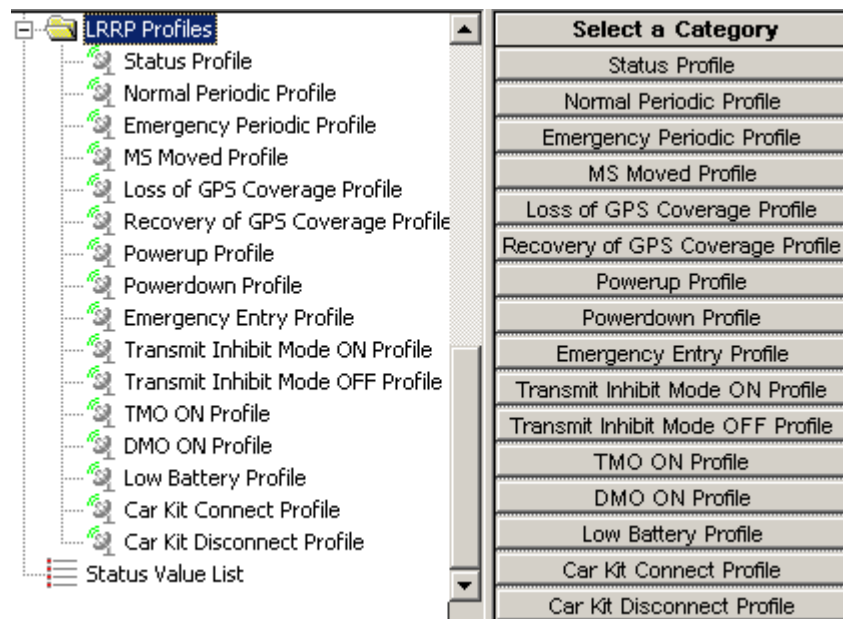
30.4.14 Loss of GPS Coverage

If the terminal detects loss of GPS coverage, and subject to the "Loss of GPS coverage" Trigger Enable settings, the terminal sends its last known location using a Location Report.

30.4.15 Recovery of GPS Coverage

If the terminal had previously detected loss of GPS coverage and then detects that it has gone back into GPS coverage, and subject to the "Recovery of GPS coverage" Trigger Enable settings, the terminal will acquire its location and send a Location Report.

30.5 LRRP Profiles



Unsolicited 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 (which we call the corresponding Profile).

If a corresponding triggered request has been received over the air, the report will be the triggered report (using the parameters sent over the air), not the unsolicited report (so the Profile will not apply).

The triggers have some of the following settings:

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.

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.

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.

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.

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.

GPS Unsolicited Uncertainty

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).

GPS Maximum Data Age

Indicates the default maximum age (in seconds) allowed for data in Location Report message for triggered reports.

Type in the required value.

GPS Maximum Acquisition Delay

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.

GPS Idle Report Period

This is the interval (in seconds) at which periodic Location Reports are sent outside Emergency Mode (0 means never).

Type in the required value.

GPS Emergency Report Period

This is the interval at which periodic Location Reports are sent in Emergency Mode.

Type in the required value.

GPS Report Distance

Defines the distance interval at which distance-based Location Reports are sent.

Type in the required value.

Distance Check Interval

Maximum interval (in seconds) at which MS checks its position for position-based Location Reports.

Type in the required value.

GPS Low Battery Level

Indicates the percentage of battery level triggering the "Low Battery" condition.

Type in the required value.

30.5.1 Status Profile

If sending an outgoing Status message via the radio menu, the radio shall acquire its location and send an UNSOLICITED-LOCATION-REPORT, provided that some additional settings in Status Id List and GPS Status Value List are configured accordingly.

30.5.2 Normal Periodic Profile

These are unsolicited Periodic Location Reports sent by the MS outside Emergency Mode.

While the terminal is not in Emergency Mode, and depending on the "Normal Periodic" Profile Enable settings, it will acquire its position and send periodic Location Reports at intervals defined by the GPS Idle Report Period (unless unsolicited reports of that nature are inhibited, in which case it will do nothing). Each such periodic report will be an UNSOLICITED-LOCATION.

Normal GPS periodic location reports are inhibited when the radio is in Emergency Mode. If GPS periodic location reports are required during Emergency Mode, then it is necessary to enable the Emergency Periodic reports.

30.5.3 Emergency Periodic Profile

While the terminal is in Emergency Mode, and depending on the "Emergency" Profile Enable settings, it will acquire its position and send periodic Location Reports at defined intervals after the first Location Report sent on entry to Emergency Mode.

Note: This requirement does not imply that any other reports are inhibited during Emergency, so any other reports caused by other requirements will still be sent, including immediate requests over the air, delta distance, and so forth.

30.5.4 MS Moved Profile

At defined time intervals, the MS will check its location against the last reported position, and send an UNSOLICITED-LOCATION-REPORT whenever the check shows the position has changed by the specified distance.

A distance based location report is only sent if the distance between the measurement and the last reported position is higher than the distance threshold. The real moved distance could be higher (for example: coming back or going around the first point); also the change will not be reported when its time elapsed is less than the preset time period.

30.5.5 Loss of GPS Coverage Profile

If the terminal detects loss of GPS coverage, and subject to the "Loss of GPS coverage" Profile Enable settings, the MS shall send its last known location using an UNSOLICITED-LOCATION-REPORT.

30.5.6 Recovery of GPS Coverage Profile

If the MS had previously detected loss of GPS coverage and then detects that it has gone back into GPS coverage, and subject to the "Recovery of GPS coverage" Profile Enable settings, the MS will acquire its location and send an UNSOLICITED-LOCATION-REPORT.

30.5.7 Powerup Profile

When the terminal is powered up, and subject to the "Power Up" Profile Enable settings, it will acquire its location and send an UNSOLICITED-LOCATION-REPORT after performing the power up sequence.

30.5.8 Powerdown Profile

When the terminal is powered down, and subject to the "Power Down" Profile Enable settings, it will acquire its location and send an UNSOLICITED-LOCATION-REPORT before performing the power down sequence.

30.5.9 Emergency Entry

While the terminal is in Emergency Mode, and depending on the "Emergency" Profile Enable settings, it will acquire its position and send periodic Location Reports at defined intervals after the first Location Report sent on entry to Emergency Mode.

Note: This requirement does not imply that any other reports are inhibited during Emergency, so any other reports caused by other requirements will still be sent, including immediate requests over the air, delta distance, and so forth.

30.5.10 Transmit Inhibit Mode ON Profile

Immediately before entering Transmit Inhibit Mode, and subject to the "Transmit Inhibit Mode ON" Profile Enable settings, the terminal will acquire its location and send an UNSOLICITED-LOCATION-REPORT.

30.5.11 Transmit Inhibit Mode OFF Profile

Immediately after leaving Transmit Inhibit Mode, and subject to the "Transmit Inhibit Mode OFF" Profile Enable settings, the terminal will acquire its location and send an UNSOLICITED-LOCATION-REPORT.

30.5.12 TMO ON Profile

Immediately after entering TMO, and subject to the "TMO ON" Profile Enable settings, the terminal will acquire its location and send an UNSOLICITED-LOCATION-REPORT.

30.5.13 DMO ON Profile

Immediately before entering DMO, and subject to the "DMO ON" Profile Enable settings, the terminal will acquire its location and send an UNSOLICITED-LOCATION-REPORT.

30.5.14 Low Battery Profile

When the terminal has a Low Battery, and subject to the "Low Battery" Profile Enable settings, it will acquire the location of the terminal and send an UNSOLICITED-LOCATION-REPORT.

30.5.15 Car Kit Connect Profile

Immediately after connection to the Digital Car Kit (DCK), and subject to the "Car Kit Connect" Profile Enable settings, the radio will acquire its location and send an UNSOLICITED-LOCATION-REPORT.

30.5.16 Car Kit Disconnect Profile

Immediately after disconnection from the Digital Car Kit (DCK), and subject to the "Car Kit Disconnect" Profile Enable settings, the terminal will acquire its location and send an UNSOLICITED-LOCATION-REPORT.

30.6 Status Value List

	ID	Enable Send Location Report	High Accuracy Mode	High Accuracy Mode Timeout (sec)
LRRP Profiles				
Status Profile				
Normal Periodic Profile	0 (out of rang	<input type="checkbox"/>	No Change	0
Emergency Periodic Profile	0 (out of rang	<input type="checkbox"/>	No Change	0
MS Moved Profile	0 (out of rang	<input type="checkbox"/>	No Change	0
Loss of GPS Coverage Profile	0 (out of rang	<input type="checkbox"/>	No Change	0
Recovery of GPS Coverage Profile	0 (out of rang	<input type="checkbox"/>	No Change	0
Powerup Profile	0 (out of rang	<input type="checkbox"/>	No Change	0
Powerdown Profile	0 (out of rang	<input type="checkbox"/>	No Change	0
Emergency Entry Profile	0 (out of rang	<input type="checkbox"/>	No Change	0
Transmit Inhibit Mode ON Profile	0 (out of rang	<input type="checkbox"/>	No Change	0
Transmit Inhibit Mode OFF Profile	0 (out of rang	<input type="checkbox"/>	No Change	0
TMO ON Profile	0 (out of rang	<input type="checkbox"/>	No Change	0
DMO ON Profile	0 (out of rang	<input type="checkbox"/>	No Change	0
Low Battery Profile	0 (out of rang	<input type="checkbox"/>	No Change	0
Car Kit Connect Profile	0 (out of rang	<input type="checkbox"/>	No Change	0
Car Kit Disconnect Profile	0 (out of rang	<input type="checkbox"/>	No Change	0
Status Value List	0 (out of rang	<input type="checkbox"/>	No Change	0

The Status Value List contains Status values, which (when sent by the user menu) can lead to transmissions of location reports and/or to automatic switching between GPS accuracy modes.

The Status values configured in the ID column of this list must also be registered in the general list of outgoing Status values.

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 messaging 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 "Mail In", & Paragraph 14.10 "Mail Out".

4 Short Data Service (SDS/PEI)

The Short Data Service (SDS) and the Peripheral 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®)

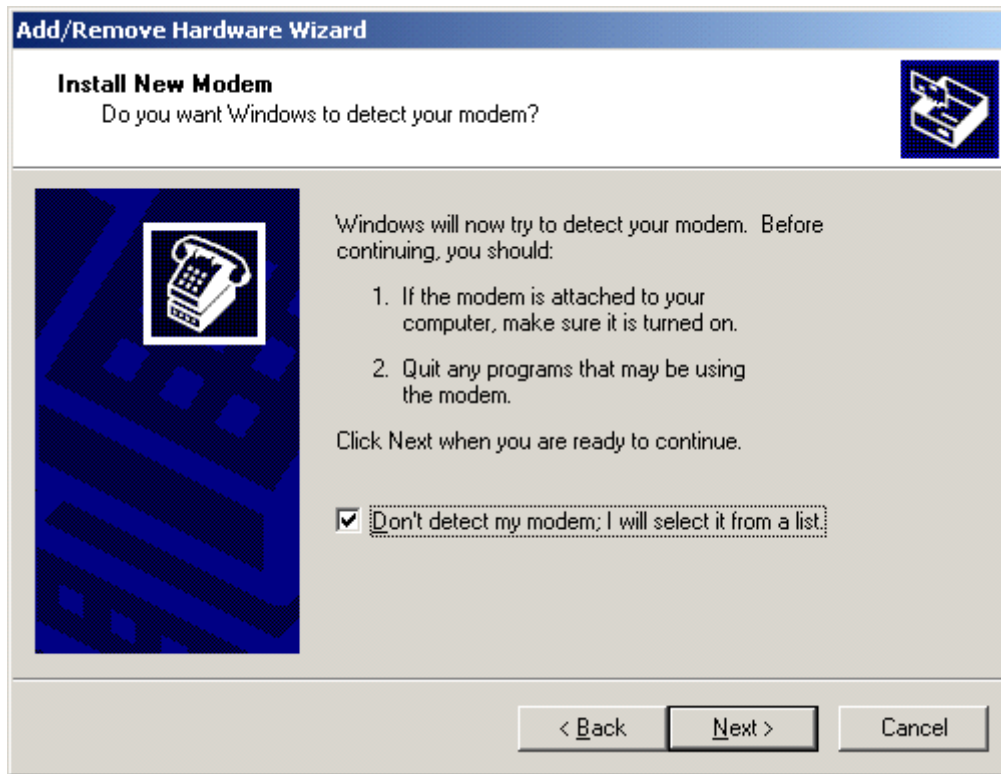
At the terminal do the following:

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:

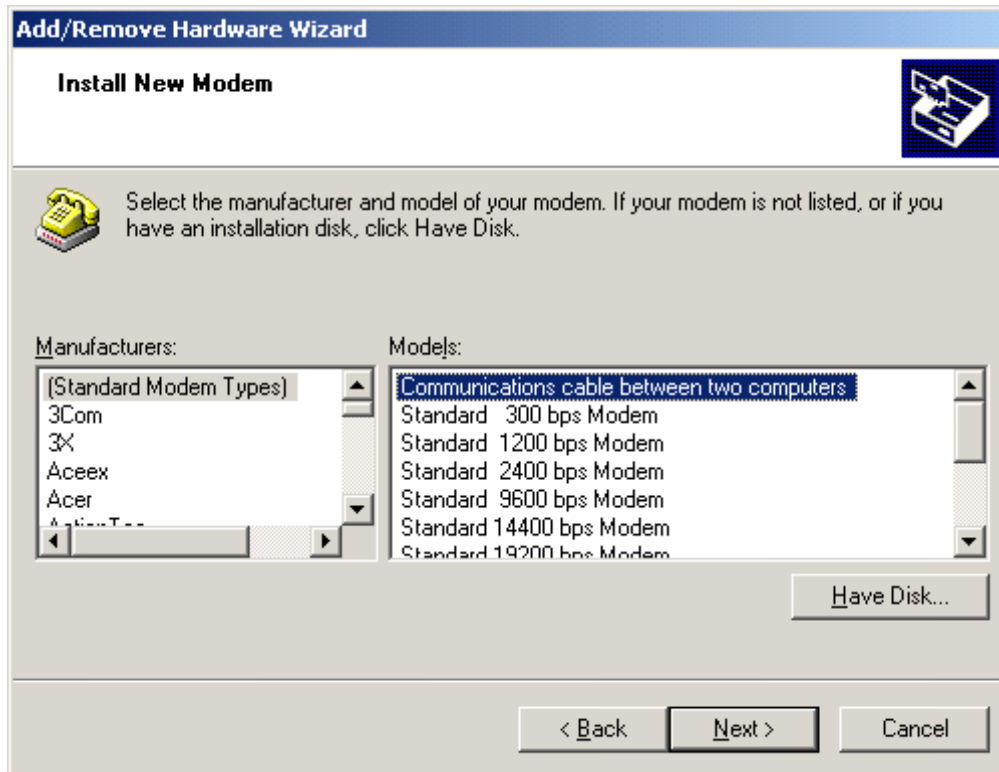
Start->Settings ->Control Panel ->Phone and Mode Options (enter dialing code if asked)

Under the modems tag select 'Add'.



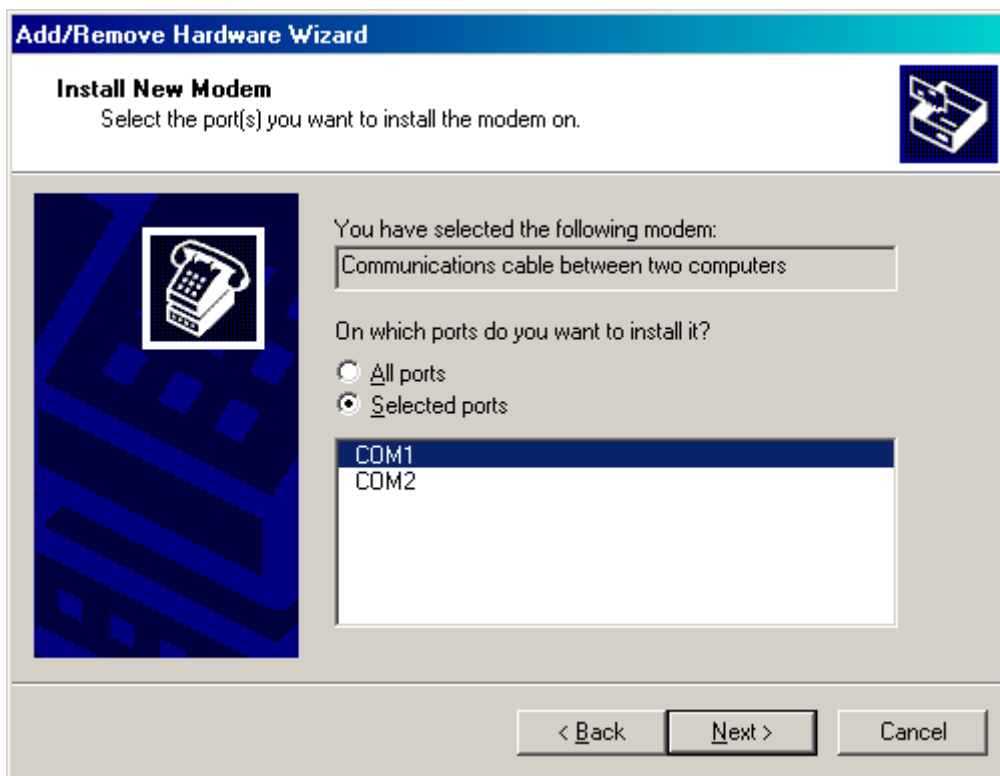
Check 'Don't Detect Modem' -> Next

Select the communication option 'Standard Modem Types'.

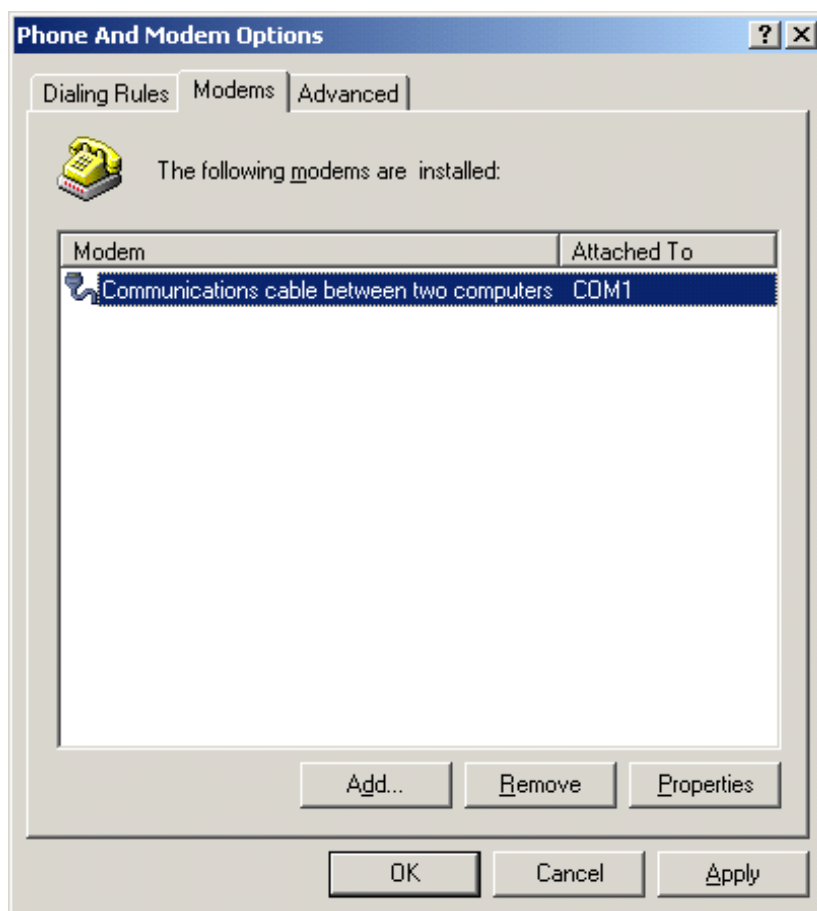


Select ->Next.

Select the communication port that will be used.



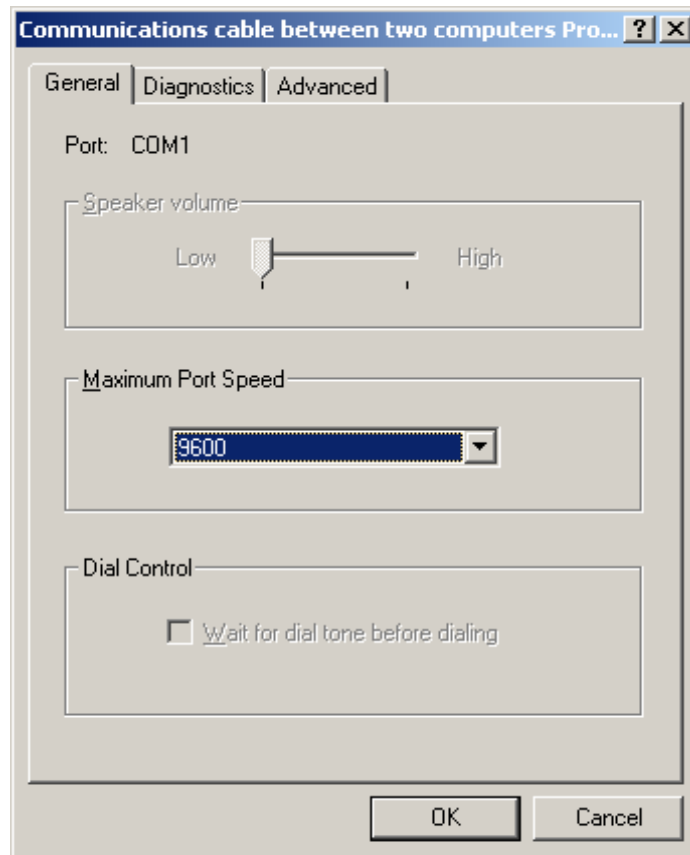
Click ->Next



Click ->Next.

Click ->Finish.

After this returns, select the newly added 'Communications Between Two Computers'.



Click 'Properties' and change the 'Maximum Port Speed' to 9600.

Click ->OK.

4.1.3 Setting up a new Network Connection (Windows 2000®)

At the computer select:

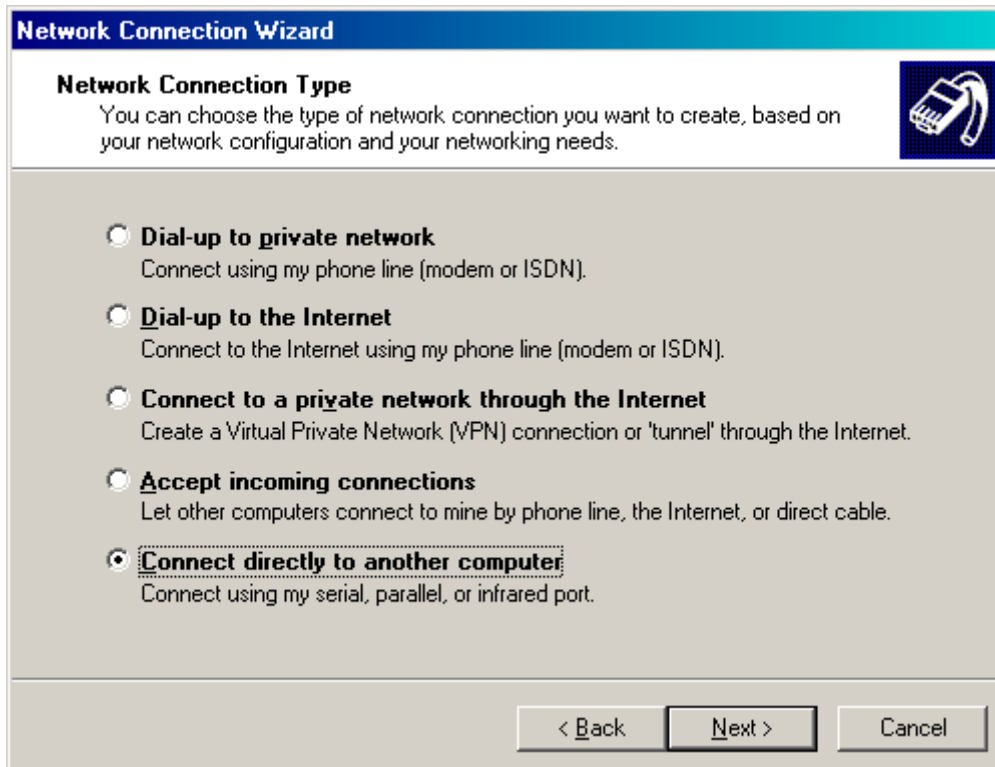
Start->Settings ->Control Panel ->Network and Dial-up Connections

Click ->Make a New Connection.



Click ->Next.

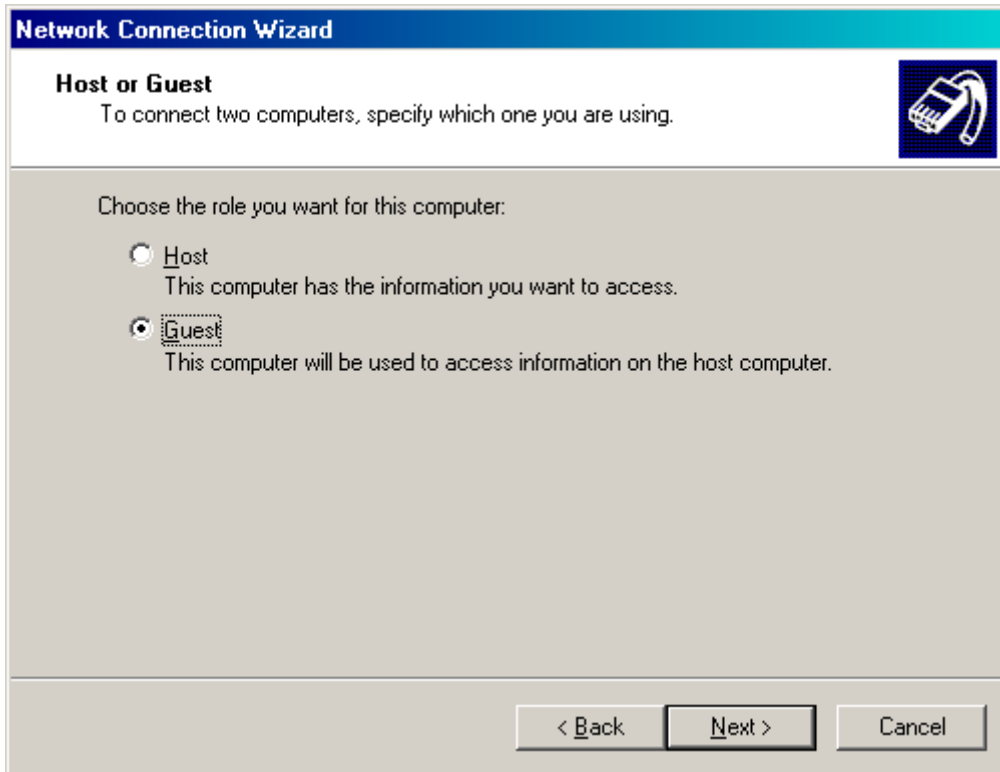
This will display the 'New Connection Wizard' window.



Choose the option 'Connect Directly to another Computer'.

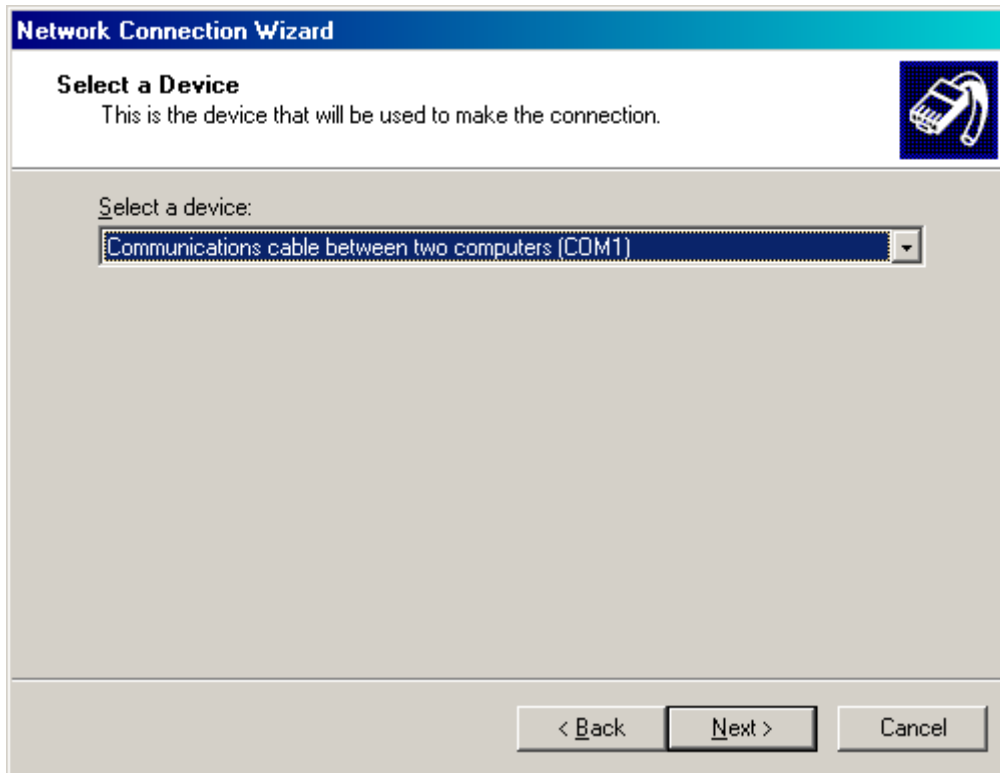
Click ->Next.

The 'Host or Guest' window will be displayed.



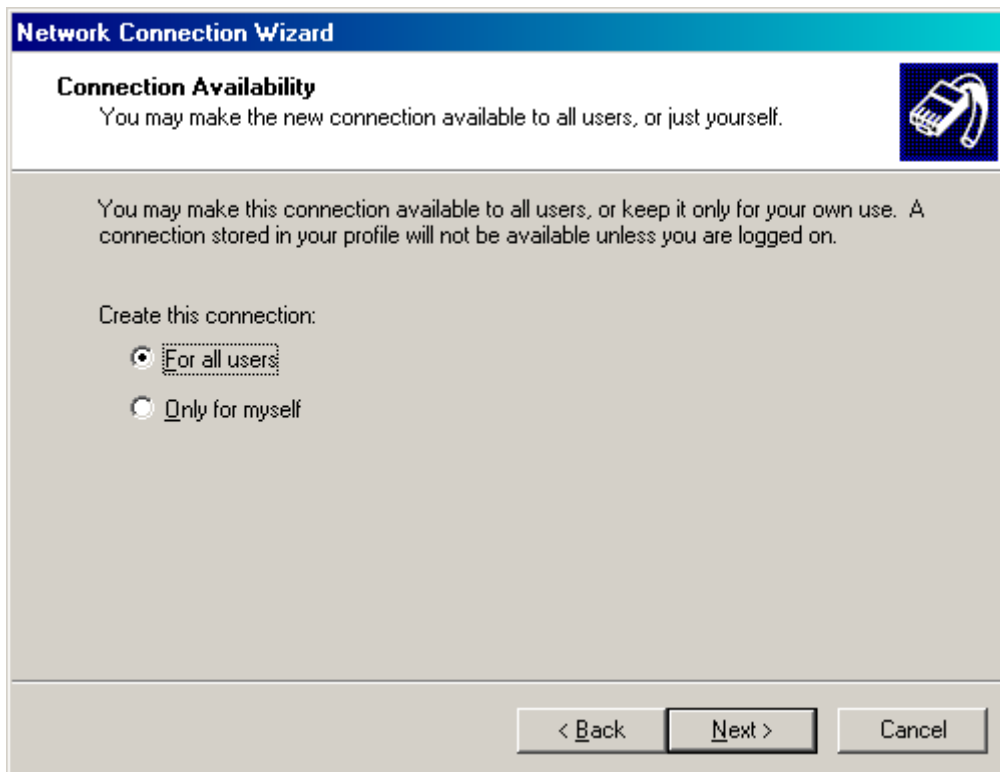
Choose the 'Guest' option as the radio system is the host.

Click ->Next.



Select the appropriate option.

Click ->Next.



Click ->Next

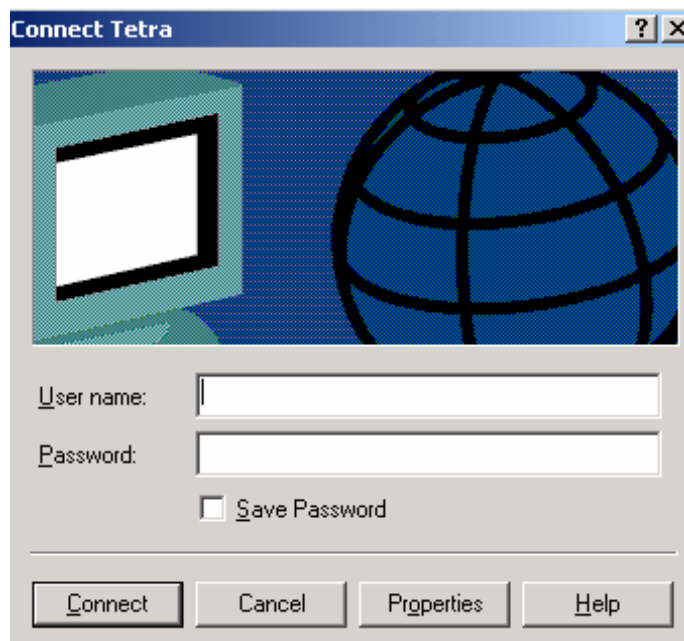


Enter a name or alias for the connection.

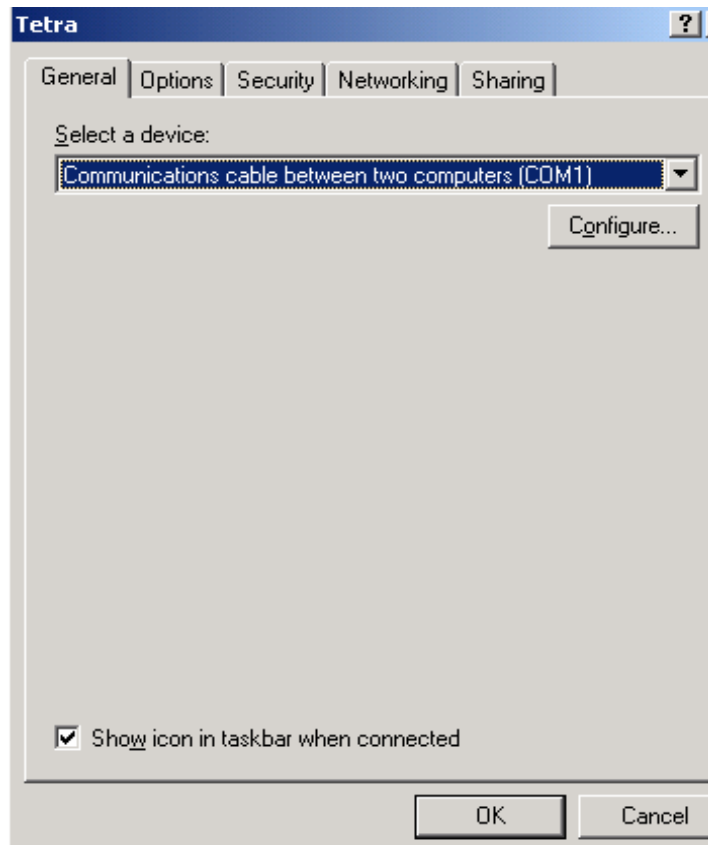
Click ->Finish.

4.1.4 Dial Up Connection Settings

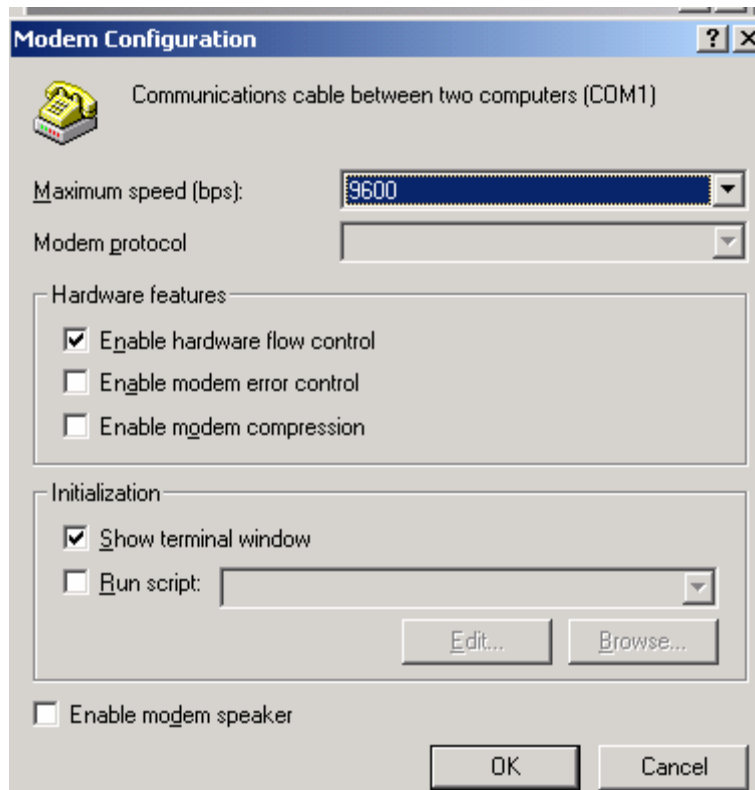
An easy method of doing this is to select the desktop icon to open the connection.



Click ->Properties.



Click ->General ->Configure.

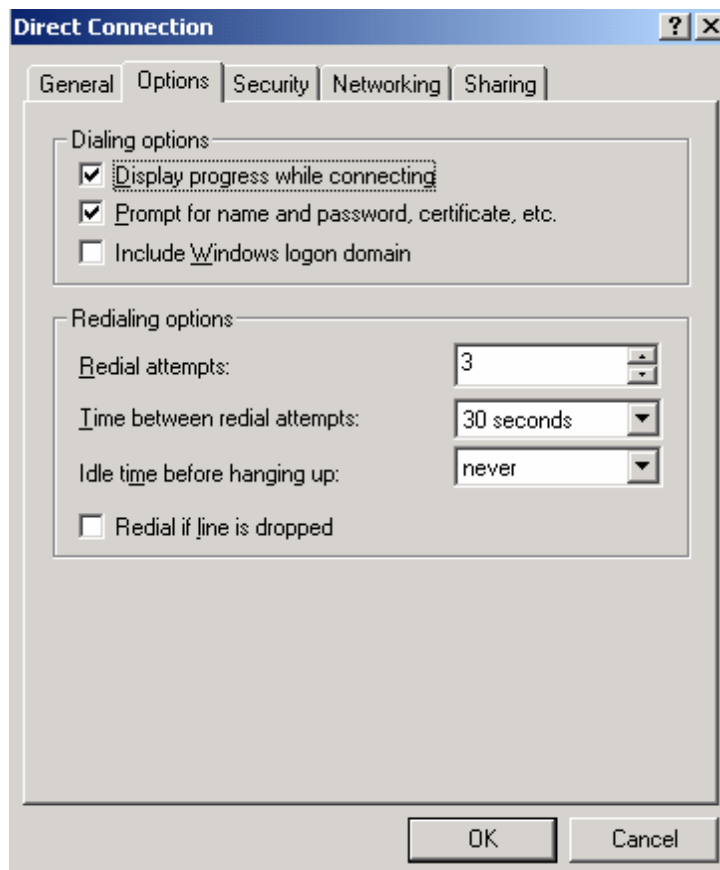


Click the 'Enable Hardware Flow Control' and 'Show Terminal Window' options.

Click ->OK.

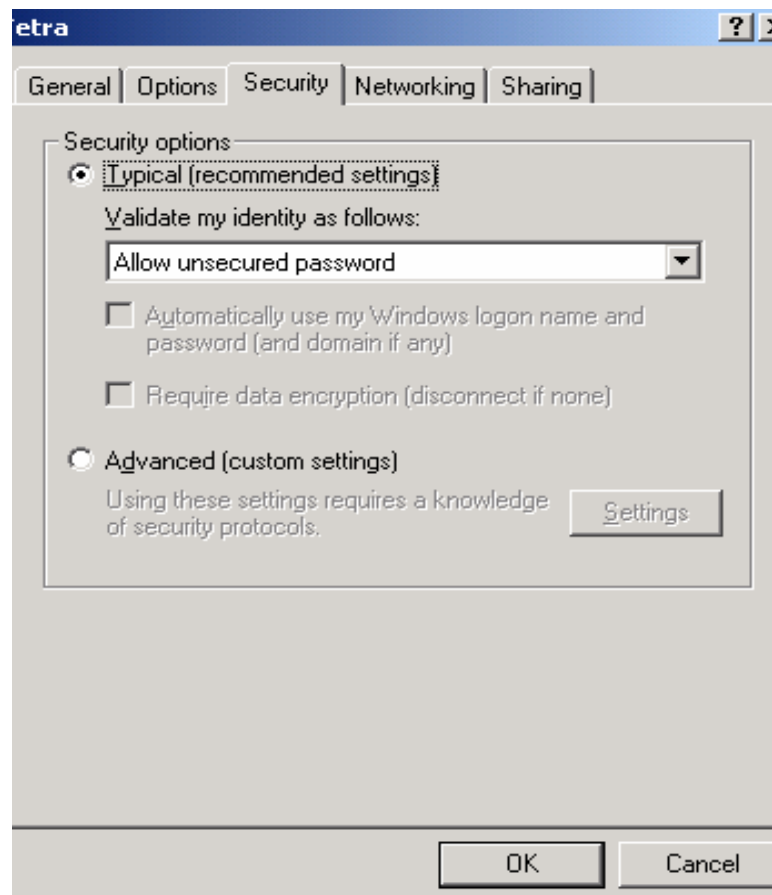
Click ->Options.

This will display the 'Options' window.



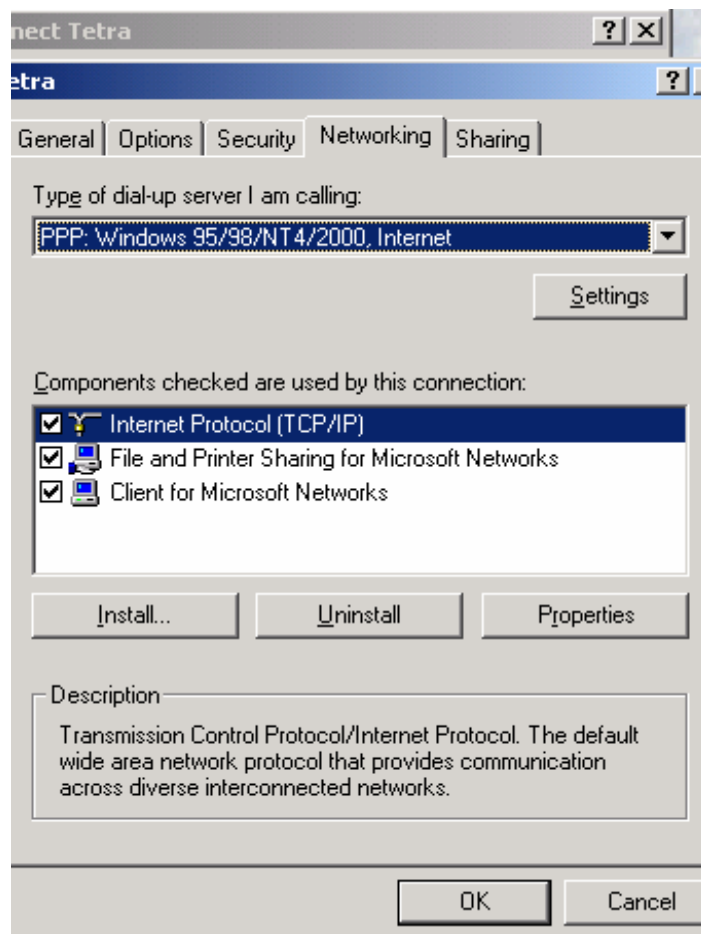
Set the displayed options.

Select ->Security



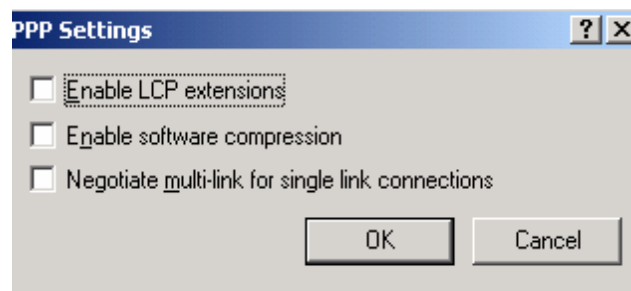
Choose the displayed settings.

Select ->Networking.



Ensure PPP: Windows[®] 95/98/NT4/2000, Internet is displayed.

Click ->Settings.

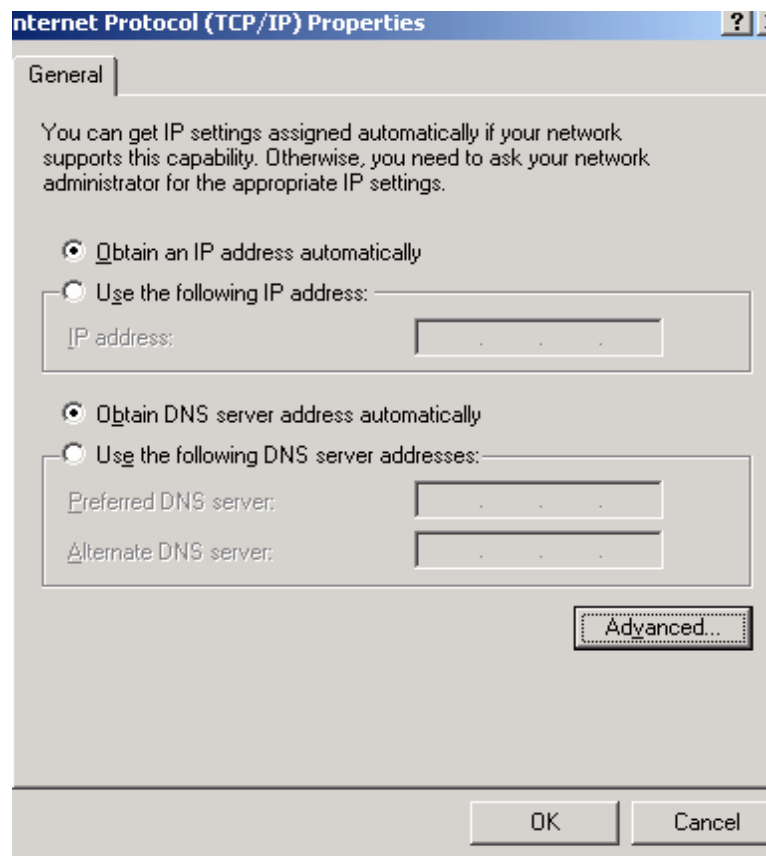


Ensure non of the PPP options are selected.

Click ->OK.

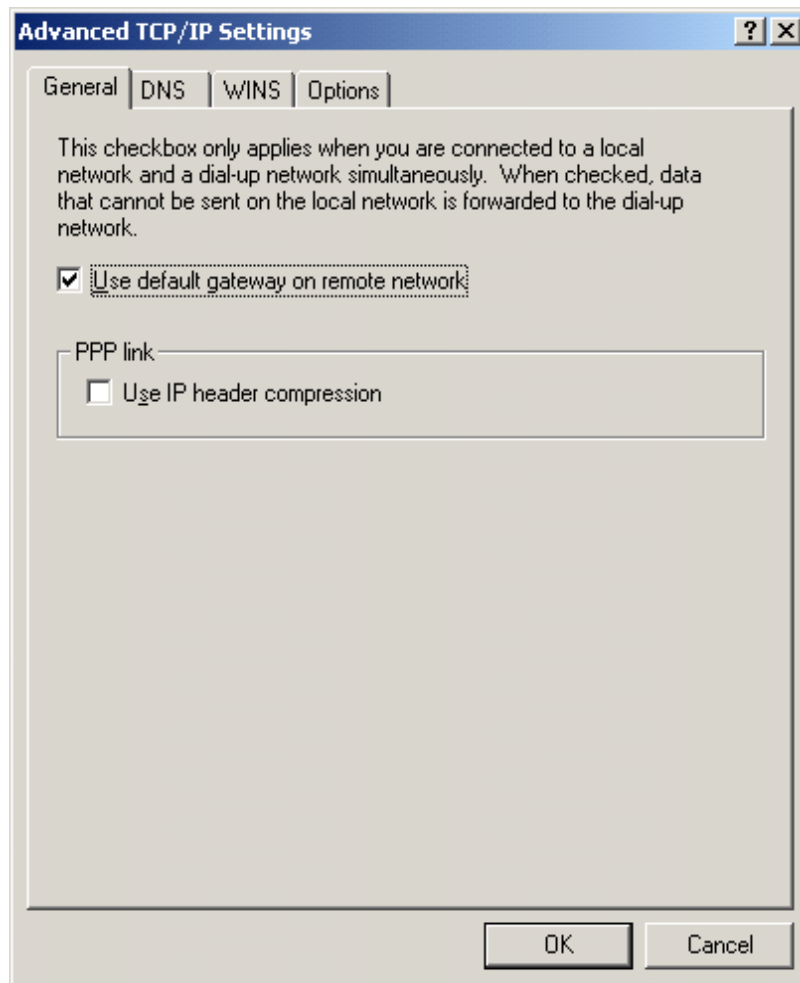
On the main window ensure that the Internet Protocol (TCP/IP) option is selected.

Click ->Properties.



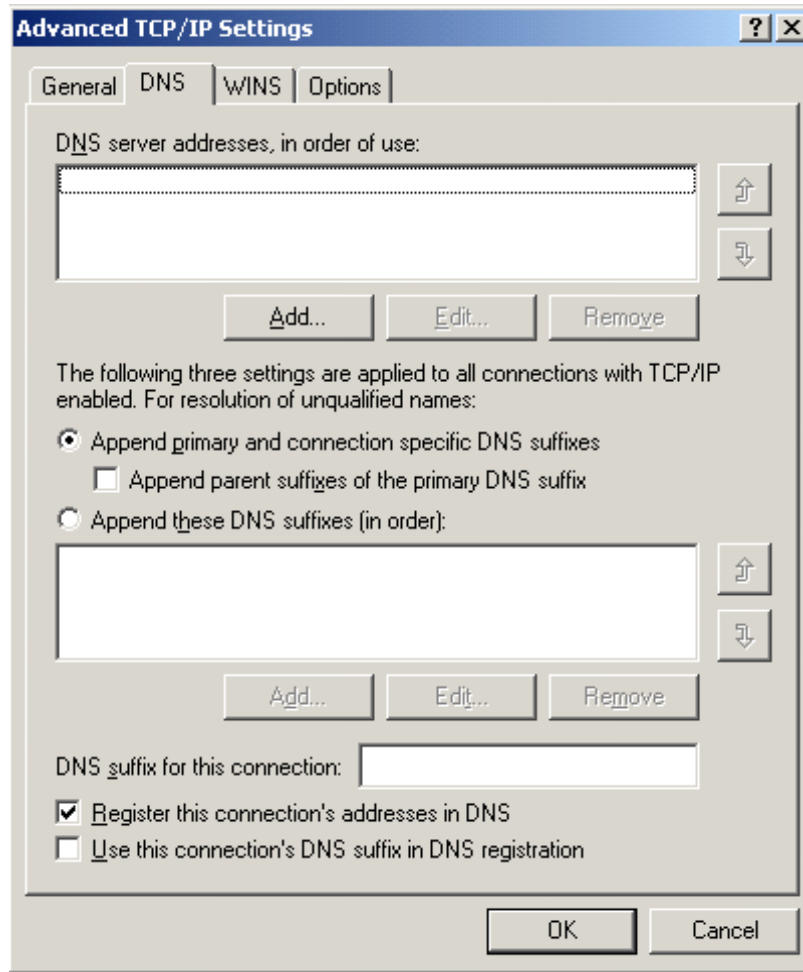
Ensure the above options are selected.

Click ->Advanced



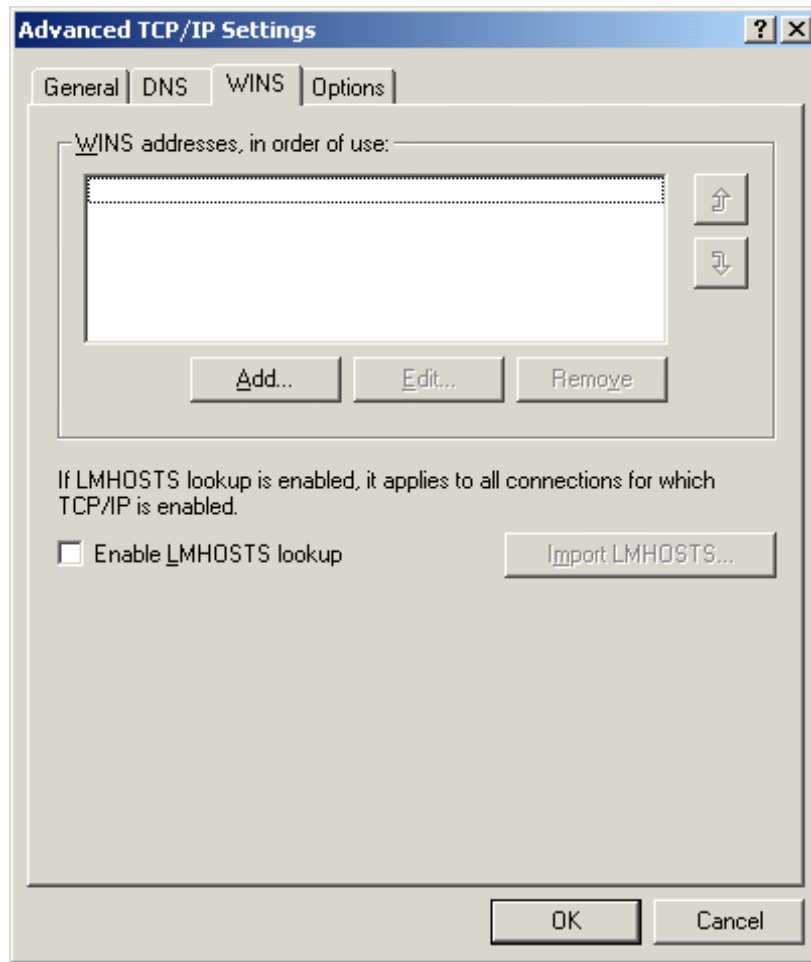
Click ->Use Default Gateway on Remote Network.

Select ->DNS

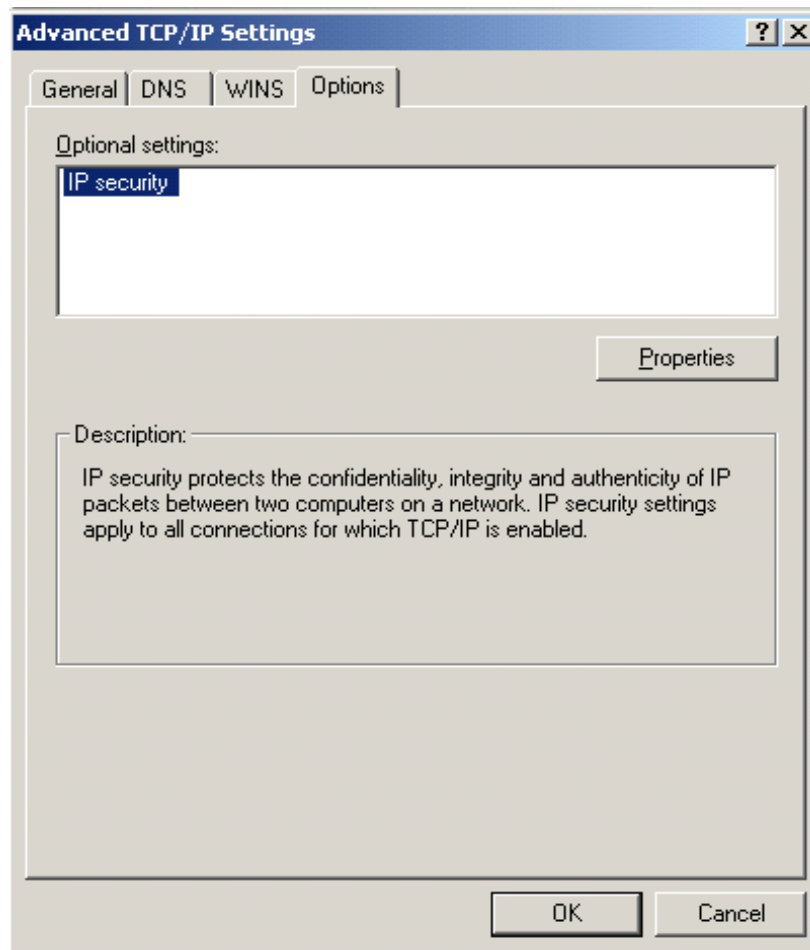


Ensure the above options are selected.

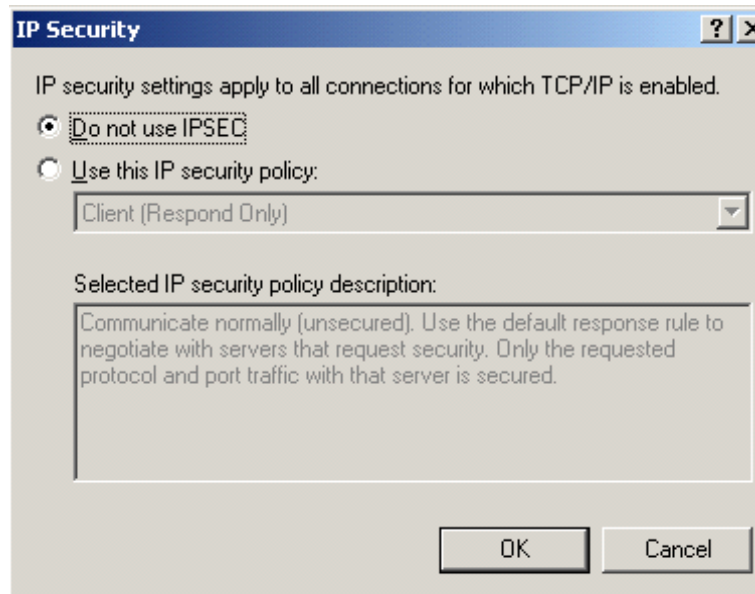
Select ->WINS



Ensure nothing is selected in this window.
Select ->Options.



Click ->Properties.



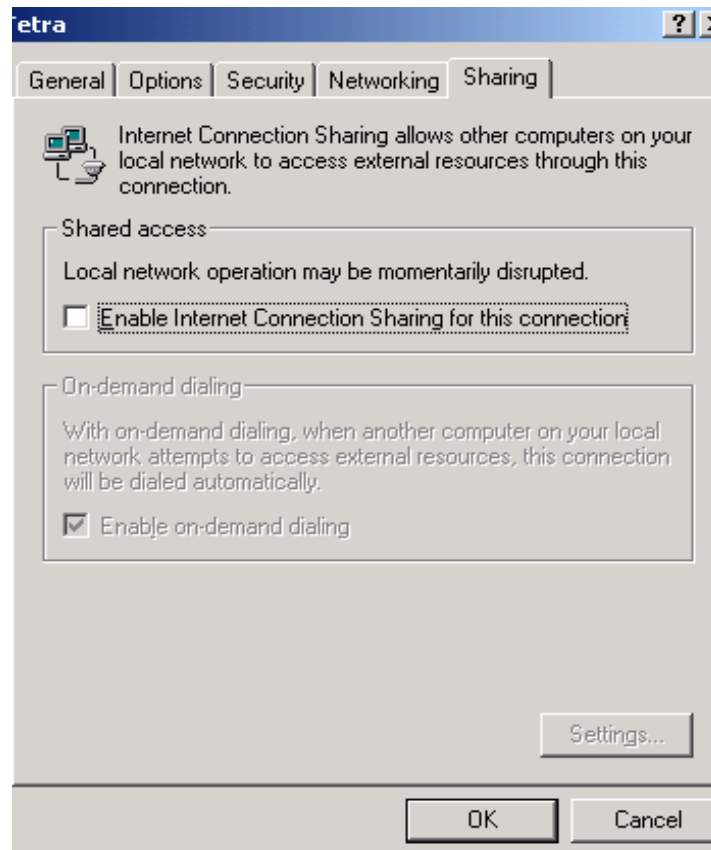
Ensure the above option is selected.

Click ->OK

Click ->OK.

Click ->OK

At the main window select ->Sharing.



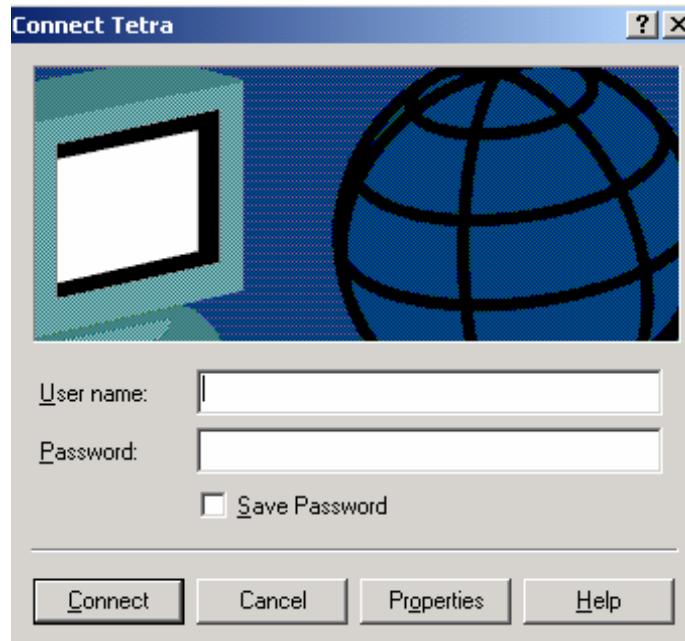
Ensure either nothing is selected or is 'Greyed' out in this window.

Click ->OK

Close the application if it is not going to be used.

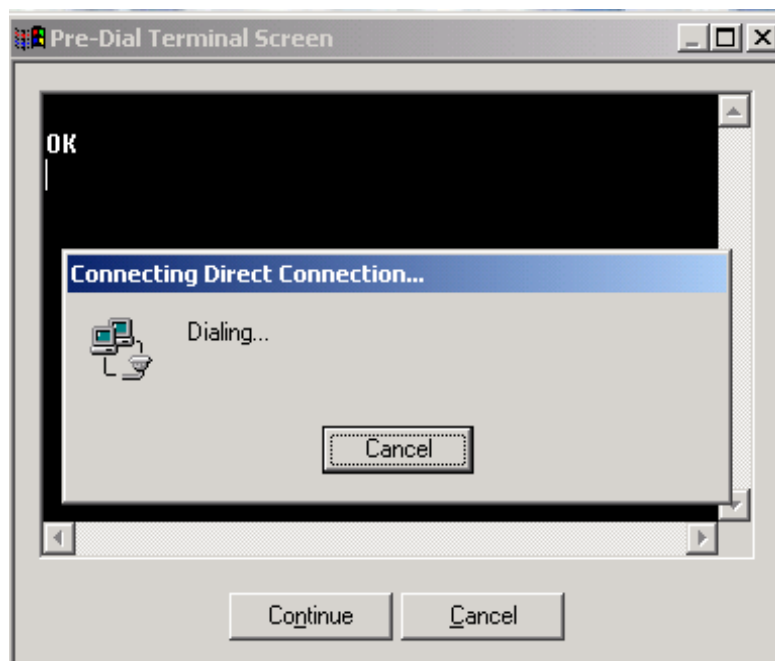
4.2 Registering on the System for Packet Data

If the application is not running, select the desk top icon.



Click ->Connect

This will open the 'Pre-Dial Terminal screen.

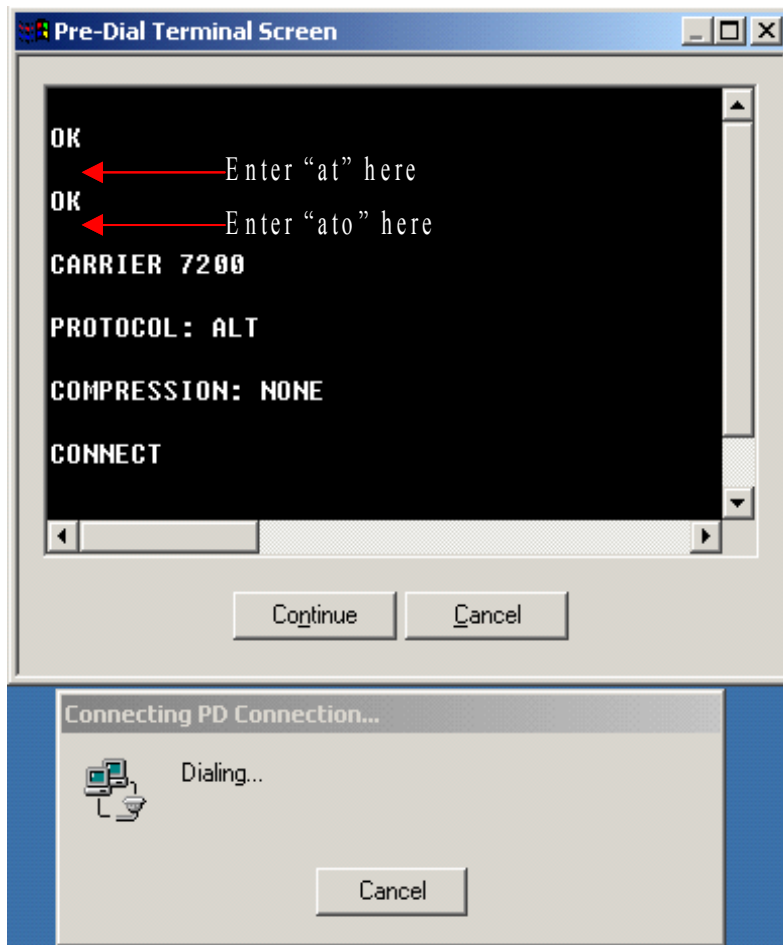


Enter the following AT commands:

At the prompt type <at><select the enter key>

At the prompt type<ato><select the enter key>

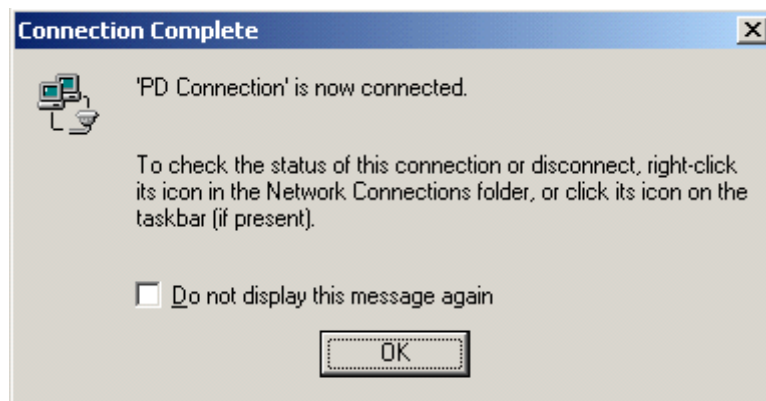
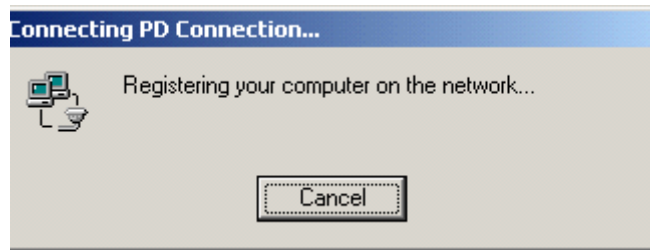
The screen will now display the following:



Click ->Continue.

The following message sequences should now be displayed:





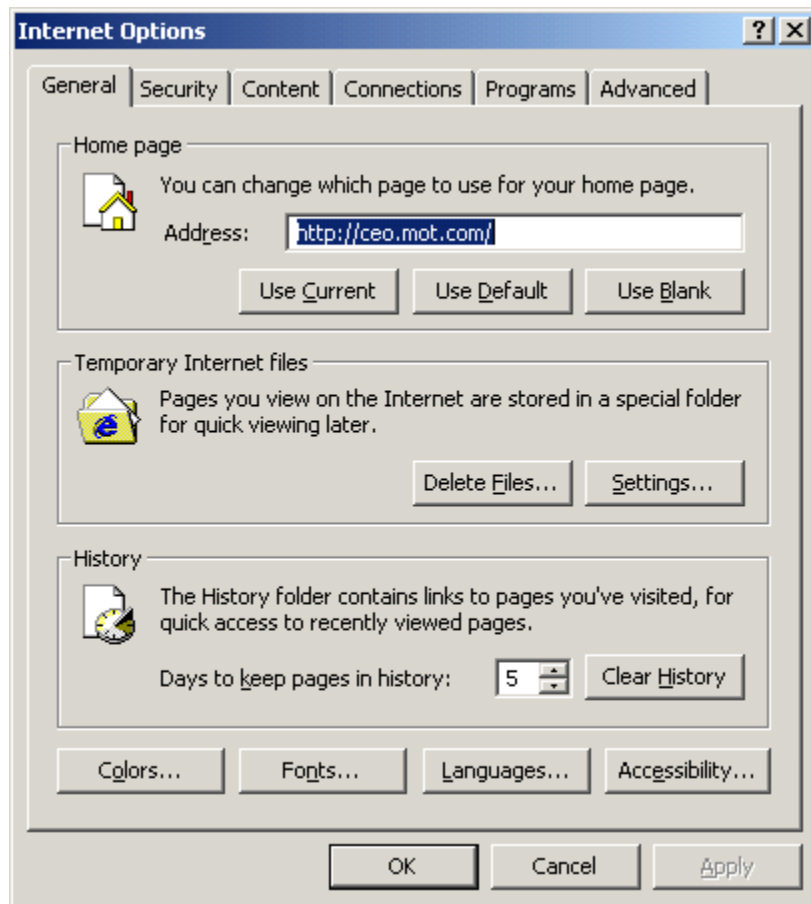
The Terminal/Computer combination is now working on the system and packet data can now be transmitted and received.

4.2.1 FTP Server

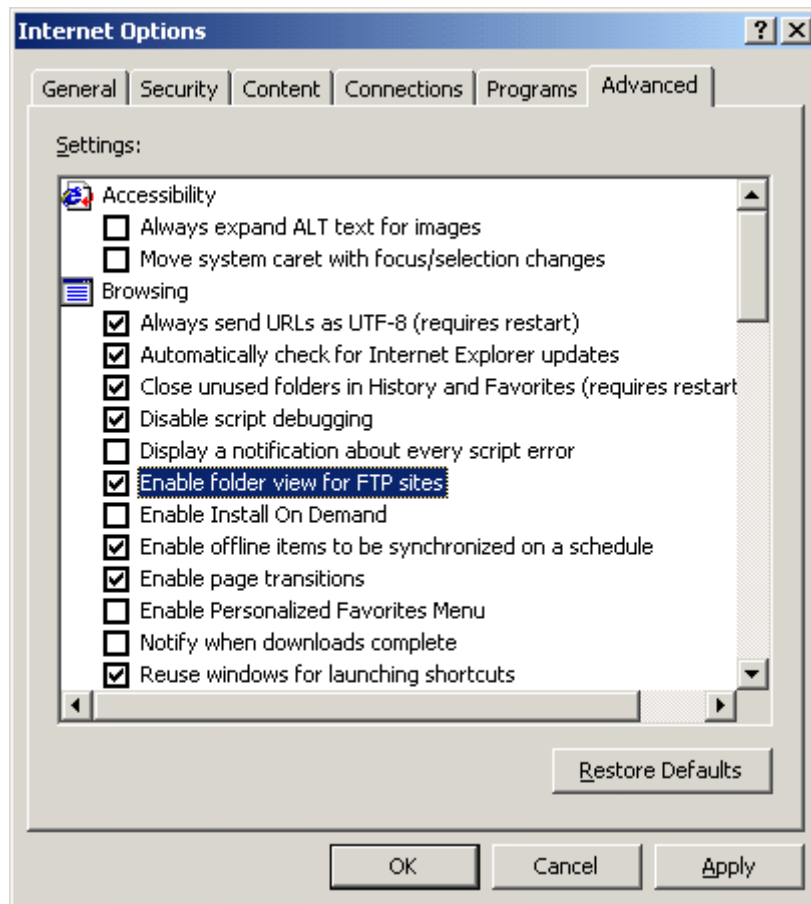
Due to issues with running FTP from Windows®, it is recommended to use the Internet Explorer® FTP option when transferring files greater than 10K.

Open Internet Explorer.

Click ->Tools ->Internet Options.



Select ->Advanced

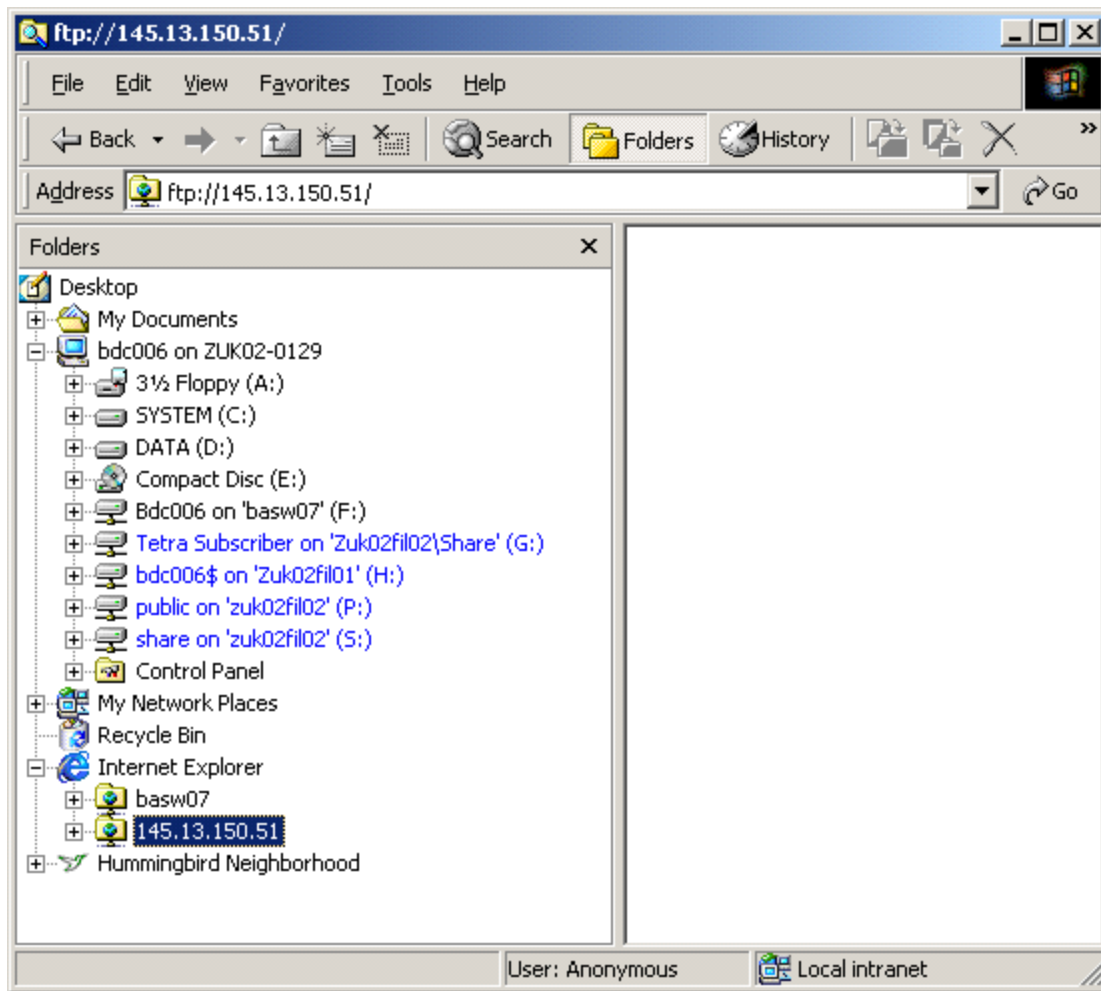


Ensure the 'Enable Folder View for FTP sites' is selected.

Click ->OK

Close Internet Explorer.

Open Windows Explorer.



In the 'Address' box, type in the following:

FTP address (for example: *ftp://145.13.150.51/*)

Change the IP address 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.

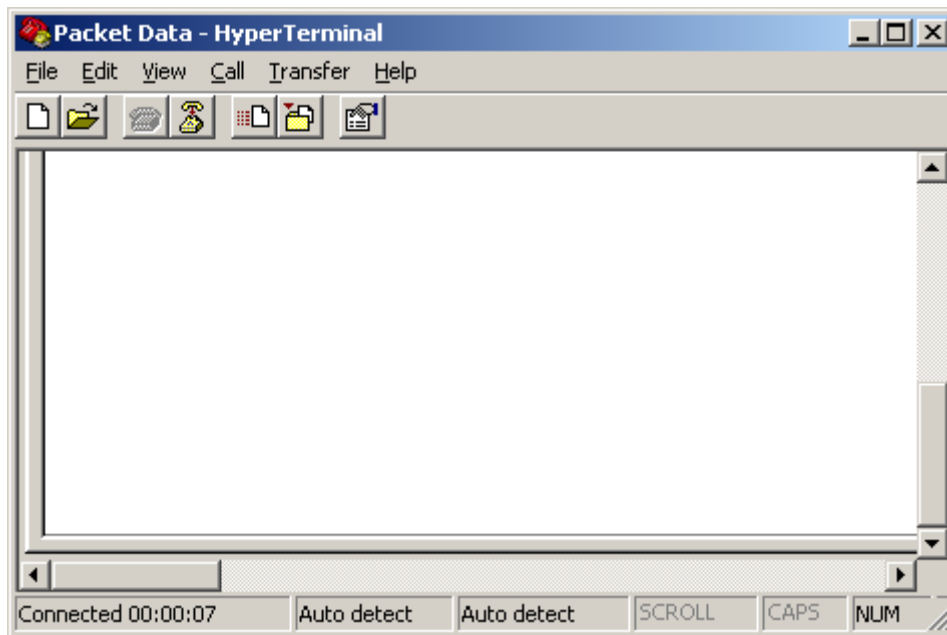
5 Hyper Terminal

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

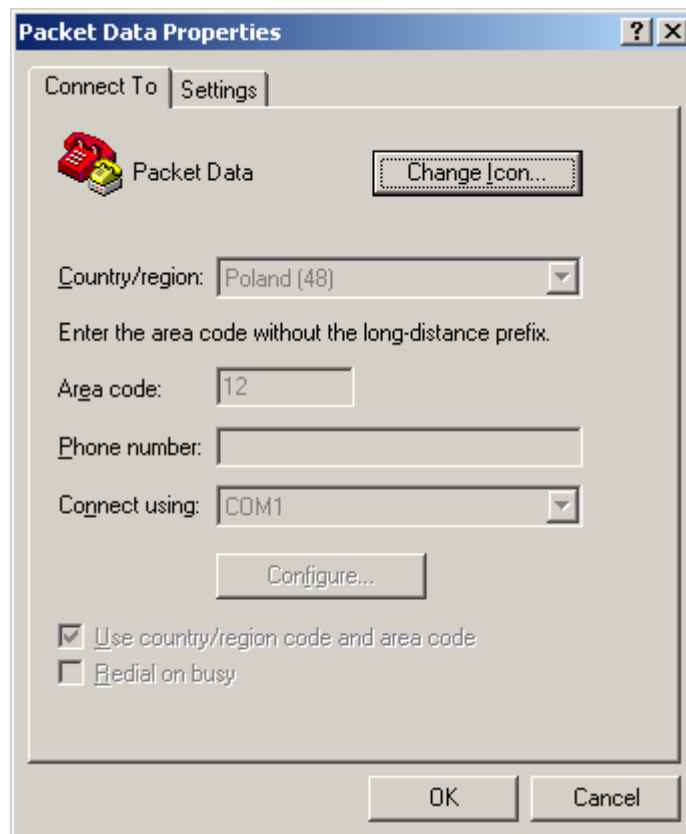
the following path to open the application:

Start ->Programs ->Accessories ->Communications ->Hyper Terminal.



Click File ->Properties

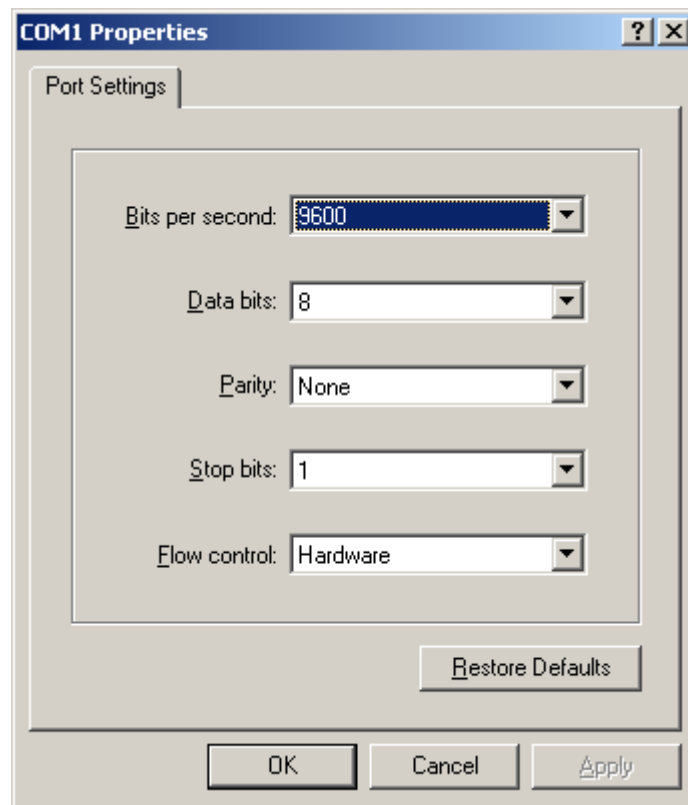
This will display the Packet Data Properties screen.



Uncheck any 'Ticked' boxes.

Select the required communication port, for example COM 1.

Click '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.

For the full set of the available AT Commands, refer to AT Programmers Guide - Issue B, DATED 30th May 2008.