MOTOROLA
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Digital Interface Unit 3000
Configuration Service Software (CSS)

User's Guide

Software Part No.
DLN6570A

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Introduction

Preview

The ASTRO Digital Interface Unit 3000 (DIU) enables remote control of a digital ASTRO base station using existing analog desktop controllers, consoles, and other analog non-ASTRO remote control devices. In addition, the DIU adds the ASTRO digital encryption capability to the existing analog remote control equipment.

The ASTRO DIU Configuration Service Software (CSS) package enables setting the DIU configuration in the field by modifying the DIU internal parameters. The CSS is PC-based software from Motorola that is used to program features into DIU units to customize their operation. This *User's Guide* describes the installation of the DIU Configuration Service Software and attaching the DIU to your computer. It also includes a description of the operation of the software, including the screen structure, menus, the keyboard commands, and the program tree.

Programming Kit

The programming kit consists of the following:

- ASTRO DIU CSS installer, available on CD-ROM, part no. DLN7670A.
- This User's Guide, Publication No. 6802972C90-O.

Who Should Use This Guide

This *Guide* is intended for anyone who will use the CSS to program the DIU unit.

What to Look For In This Guide

This guide is organized as follows:

- *Section 1* describes the CSS installation process.
- *Section 2* provides an overview of the CSS and provides information about how to obtain on-line help and navigate through the user interface.
- *Section 3* explains the hardware setup required for programming DIU unit.
- *Section 4* explains the CSS configuration.
- *Section 5* is a tutorial that provides step-by-step tutorial with instructions on how to perform selected tasks using the CSS.

The Appendices contain:

- *Appendix A:* Keyboard shortcuts
- *Appendix B:* Troubleshooting information
- *Appendix C:* Contact information for Motorola technical support
- *Appendix D:* Acronyms and Abbreviations
- *Appendix E*: Glossary

Note: This guide assumes that you are familiar with basic Windows operations. If this is not the case, be sure to read the documentation that came with your version of Windows before you proceed.

What to Look for Online

This manual is designed to supplement the on-line help installed with the CSS. Be sure to refer to the on-line help for context-sensitive information about the following:

- Codeplug parameters
- CSS functions
- CSS services

Conventions Used in This Manual

The following conventions are used throughout this manual:

Italics	Used for emphasis and for new terms.
Bold	Used to indicate keyboard keys or application buttons.
File/Open	Used to designate the location and name of a CSS menu function. For example, File/Open refers to the Open function in the File menu.
Tips:	Denotes tips and hints on using the CSS.
Note:	Indicates an operational procedure, practice, or condition to which you should pay special attention.
CAUTION:	Alerts you of conditions which can result in loss or corruption of data, or damage to application files.

Table 1. Conventions in This Document

Section 1: Installing the Software

System Requirements

The ASTRO DIU 3000 CSS requires an IBM® PC or 100-percent compatible computer with the following minimum configuration:

- Processor Pentium 3 or later
- Memory (RAM) 128 MB
- Free hard disk space for installation 20 MB
- CD-ROM drive only
- Operating systems Microsoft Windows XP, Windows 2000
- One serial port
- Programming cable, Motorola part no. 30-80385B23 and RJ45 to DB25 adapter, part no. 58-80385B30
- DB25 to DB9 cable adapter, Motorola part no. 01-80379B69

Installing the CSS from CD-ROM

The installation program is included on the supplied CD-ROM. In order to install the CSS on a hard drive, do the following:

- Quit all Windows applications to ensure a successful installation.
- Insert the CD-ROM into its drive.
- Start the Windows Explorer. Navigate to CD-ROM root directory and double-click **Setup.exe** to run CSS installation. The setup program will run InstallShield ® Wizard to guide you through the installation process.
- When the **Welcome** screen appears, read the instructions and click Next.
- In the **Choose Destination Location** screen, click **Next** to install the CSS in the default location. To select a different installation directory, click the **Browse** button.
- Select the desired Program Folder and click **Next** to begin the installation.
- When the setup is complete, click **Finish** to exit setup.
- Restart your computer. Once the CSS is installed, you can routinely launch the CSS from the Windows Start menu or using the desktop shortcut (if created). If the CSS does not start up as described above, see Appendix B, Troubleshooting Information.

CAUTION: Do not delete or move any files installed with the CSS.

Section 2: Configuration Service Software (CSS) Overview

Getting Around in the CSS

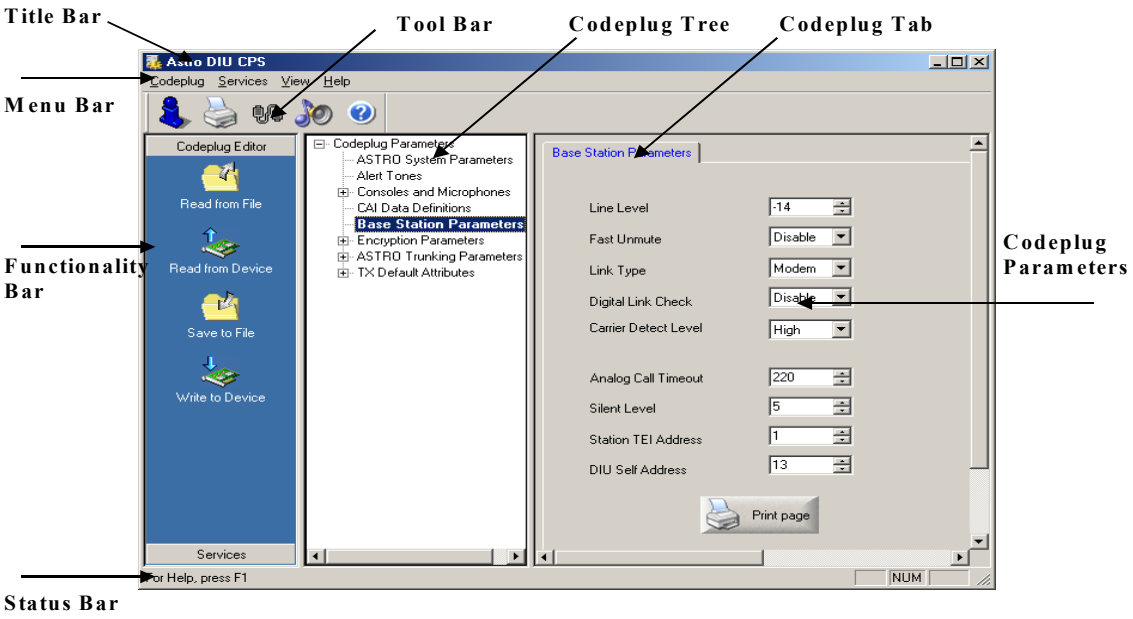

Figure 1. CSS Main Application Window

Every CSS function can be accessed through the menus, tool bar, or functionality bars. In addition, keyboard shortcuts (as described in Appendix A) allow access to most usable CSS functions. Every codeplug parameter can be accessed from the Codeplug Tree. These methods of navigation are explained below.

Title Bar

The title bar is located along the top of a window. It contains the name of the application Codeplug File name, if codeplug data is loaded.

Figure 2. CSS Title Bar

Note:
To move the window, drag the title bar. You can also move dialog boxes by dragging their title bars.

Menu Bar

The CSS Menu Bar consists of four menu items (see figure 3):

Figure 3. CSS Menu Bar

The Codeplug menu allows you to perform standard codeplug file/device management functions. These functions are listed below:

Read From File	Reads the Codeplug from existing file.
Save	Saves a Codeplug to the file.
Save As	Selects a location to save a file; creates a backup codeplug file.
Close	Closes the active document.
Read Device	Reads a codeplug data from device.
Write Device	Writes a codeplug data to device.
Print	Prints a codeplug.
Print to file	Prints a codeplug to a file.
Print Setup	Changes the printer and printing options.
Exit	Exits CSS.

Table 2. Codeplug Menu Functions

Services Menu

The Services menu allows access to certain DIU hardware and software configuration parameters, the DIU error list, and diagnostic information. Prior to accessing the services screens, the codeplug must be loaded into your computer's memory (via the READ functions). You can access the following features through this menu:

Show DIU Configuration	Provides information on the version numbers of the various DIU software parts and on the DIU hardware configuration.
Make DSP Tune-up	Used to CHANGE/VIEW some Special Tuning parameters related to the DSP. These parameters may need to be changes during system setup.
Make EMC Tune-up	Allows programming of new EMC default parameters. Use this function only for the rare occurrence of an EMC software upgrade.
Monitor DIU-CSS traffic	Allows viewing messages that the DIU sends over the RS232 link.
Show DIU Error List	Allows reading and viewing the current error list from the DIU.

Table 3. Services Menu Functions

View Menu

The View menu offers the following commands:

Toolbar	Shows or hides the toolbar.
Status Bar	Shows or hides the status bar.

Table 4. View Menu Functions

Help Menu

The Help menu offers the following commands, which provide you assistance with this application:

Help Topics	Offers you an index to topics on which you can get help.
About	Displays the version number of this application.

Table 5. Help Menu Functions

Refer to the context-sensitive help to familiarize yourself with the functions you can perform from each menu.

Tool Bar

The CSS tool bar (figure 4) includes buttons for some of the most common operations:

Figure 4. CSS Tool Bar

About	Displays the version number of this application.
Print	Allows printer setting; prints currently loaded codeplug.
Communication port settings	Selects the serial port through which the CSS computer is connected to the device.
Sound properties	Selects the sound that will be played by the functionality table error notifications.
Help	Provides context-sensitive help.

Table 6. CSS Tool Bar

Tips:
Refer to the context-sensitive help to familiarize yourself with the functions you can perform from the tool bar. For tips on toolbar button functions, make the application window active and hold the cursor over each button without clicking.

To display or hide the toolbar, choose Toolbar from the View menu.

Keyboard Navigation

Use some of the keyboard keys to navigate through the CSS and to change field values. The keyboard shortcuts that you can use to navigate through Codeplug spreadsheets are listed in Appendix A.

Codeplug Tree View

The CSS displays the DIU codeplug in a tree structure. To display a codeplug page, click the desired entry. A codeplug must be loaded into your computer's memory (via the Read Device or Read File functions) before you can access the codeplug parameters. You may edit an archive file without a DIU connected.

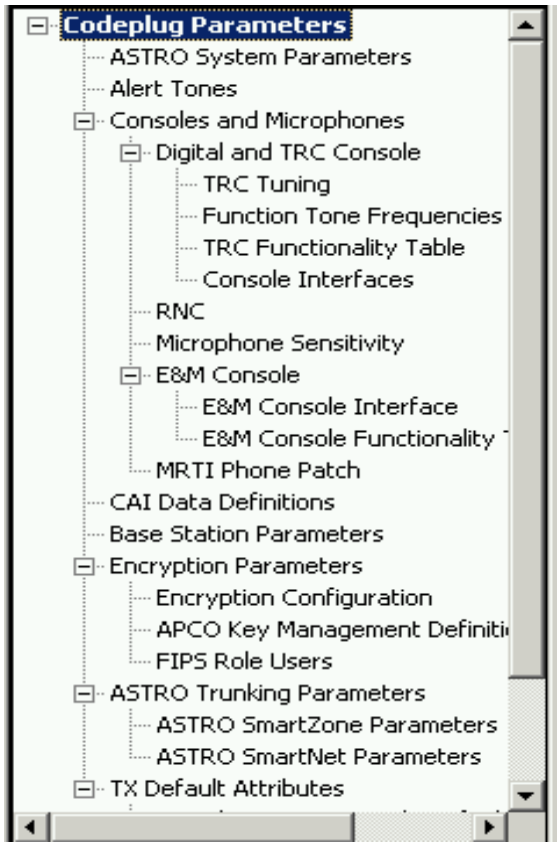

Figure 5. CSS Codeplug Tree

Functionality Bar

The Functionality Bar is located on the left-hand side of the document window. It displays the shortcuts to the ASTRO DIU 3000 Codeplug Menu and Services. To perform an action, click the desired entry.

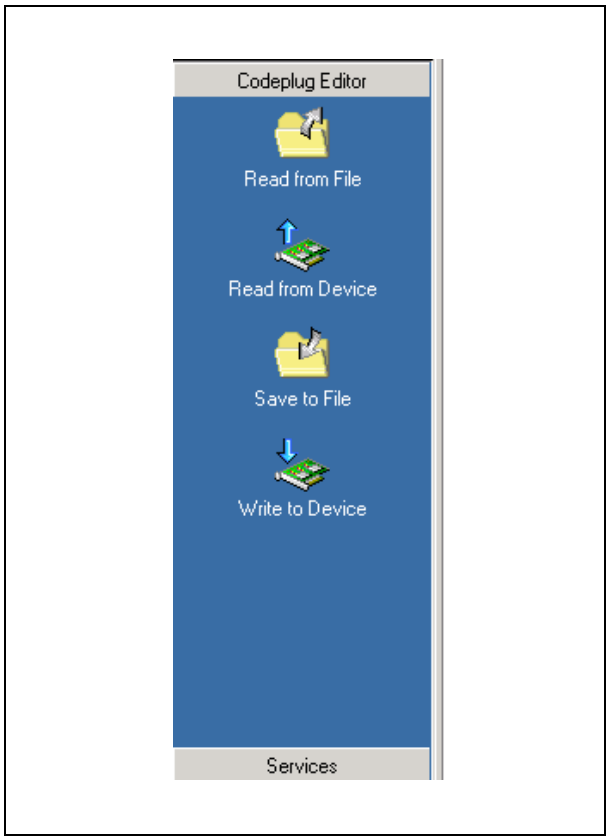

Figure 6. CSS Functionality Bar

Status Bar

The status bar is located at the bottom of the document window. It displays information about a command or toolbar button or an operation in progress.

Codeplug Structure

Before you can access the codeplug parameters, a codeplug must be loaded into your computer's memory (via read device or read file functions). You may edit an archive file without a device connected and save your modifications in that or a new archive file.

CAUTION:

Editing the codeplug parameters does NOT actually modify the DIU codeplug data, but rather modifies a copy of the data retrieved from the DIU codeplug (or archive file) via read device or read file functions. After all modifications are completed, you MUST program the changes back into the DIU or SAVE them to a new archive file. Otherwise, the modifications will be lost when you exit the CSS.

Note:
In some cases, a system configuration must be ENABLED to allow you access to its corresponding parameter screen. For example, the ASTRO SmartZone System parameter must be enabled before you can view the ASTRO SmartZone Parameters screen. Note that the corresponding parameter screen may be more than one level below the configuration screen. For example, the TRC Console configuration must be enabled before accessing the TRC Console screen under the Consoles and Microphones parameter screen.

Codeplug parameters are divided into several different sections:

Codeplug Tab	Codeplug Parameters	Tab Description
ASTRO DIU 3000 System Parameters	Encrypted System Analog Mode Support Centracom Signalling Link RNC Link Data & OTAR Support Analog Console Handset User MRTI Phone Patch ASTRO Trunking System	Used to view/change the DIU ASTRO system configuration parameters
Alert Tones	Alert Tone Level Alert Clear TX Alert Clear RX Alert TX Key Fail Alert RX Key Fail Alert Key Reset Data Busy Tone	The Alert Tones screen is used to view/change the DIU alert tones parameters. These parameters should be selected during system setup.
Console and Microphones	Digital, TRC Console TRC Tuning, Function Tone Frequencies, TRC Functionality Table, Console Interfaces RNC Microphone Sensitivity E&M Console E&M Console Interfaces, E&M Console Functions, MRTI	Used to CHANGE/VIEW console and RNC specific information such as guard tones, tone duration, TRC functionality table and console/RNC interface definitions.
Common Air Interface (CAI) Data Definitions	CAI Data Port Number Of Data Transmit Attempts Acknowledge Timeout CAI Individual Address	The CAI Data Definitions screen is used to view/change the parameters controlling how the DIU handles Common Air Interface Data. To enter this screen, "Data & OTAR Support" must not be disabled in the System Parameters screen.

Codeplug Tab	Codeplug Parameters	Tab Description
Base Station	Line Level Fast Unmute Link Type Digital Link Check Carrier Detect Analog Link Check V.24 Clock Source Analog Call Timeout Silent Level Smartnet System Address Of The Station Smartnet System Address Of The DIU	The Base Station screen is used to view/change parameters related to the interface to the ASTRO base station connected to the DIU. These parameters should be selected during system setup. **Note:** Some parameters on this page will not be available based on the context.
Encryption parameters	Encryption Configuration APCO Key Management Definitions FIPS Role Users	Used to CHANGE/VIEW encryption parameters including basic parameters of the encryption module, key indexing, and FIPS information. These parameters should be selected during system setup. Due to security restrictions, encryption parameters cannot be stored in archive files. You must download the encryption parameters from a DIU before viewing them. These restrictions are implemented to conform Federal standards for encryption user access.
ASTRO Trunking Parameters	SmartZone Parameters SmartNet Parameters	Used to CHANGE/VIEW the DIU ASTRO SmartZone and Smartnet parameters. These parameters should be selected during system setup.
TX Default Attributes	Digital, TRC, SN Console Default TX Attributes Interconnect/Phone Patch Default TX Attributes Handset ("DIU Local User") Default TX Attributes E&M Console Default TX Attributes	Defines the default attributes to be used upon transmission from the various control equipment connected to the DIU. This equipment includes handsets, consoles, and phone patch. In each case different attributes can be used, such as self-ID, channel, and TX mode. These parameters should be selected during system setup.

Table 7. CSS Codeplug Description

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Section 3: Hardware Setup

How To Connect The ASTRO DIU 3000 Device

To communicate with the DIU device, do the following:

- Connect the programming cable (Motorola Part No. 30-80385B23) to the DIU 'COMPUTER' port.
- Connect the RJ45 side of the RJ45-to-DB25 adapter (Motorola Part No. 58-80385B30) to the programming cable.
- Connect the DB25 side of the RJ45-to-DB25 adapter to your PC serial port. Refer to your computer owner's manual for the location of the serial ports.

Note:

- If using a PC computer with a DB9 type serial port, connect the DB25-to-DB9 adapter (Motorola Part No. 01-80379B69) between the computer and the DB25-to-DB9 adapter.

RJ45	DB25 Female	DB9 Female	Description
7	2	3	Receive Data
2	3	2	Transmit Data
8	7	5	Ground

Table 8. RJ45, DB25, DB9 Connector Pin Description

Section 4: CSS Configuration

Select the serial port through which the computer will be connected to the DIU unit as the following:

- Click the 'Select COM Port' button on the Toolbar.
- Use the arrow keys to select the required port (consult your computer owner's manual for a complete description of the Asynchronous Communication Ports).
- Click OK to confirm the selection**.**

Section 5: Tutorial

This tutorial provides an overview of the tasks you will perform most frequently using the CSS. Refer to the "Help on Specific CSS Tasks" section in the on-line help for a more comprehensive task list. Before you start, make sure the CSS is up and running. Begin by reading a codeplug from the ASTRO DIU 3000 unit and making a backup copy that you can use in the tutorial.

Using the On-Line Help System

The on-line help contains detailed context-sensitive help for using the CSS. To access the help system:

To Access:	Do this:
General help on using Windows	Click the Windows Start menu and select Help.
Help contents	Select Help and then Help Topics from the CSS main menu.
Help on a part of the CSS window	Click the '?' button on the CSS toolbar and click the part of the window on which you need help.
Help on a CSS dialog box	Click the '?' button in the dialog box. For help on parts of a dialog box, click the button on the dialog box title bar and then click the part of the dialog box for which you need help.
Context-specific help on a CSS field	Press the F1 key when the cursor is in that field.
Help on a specific CSS menu Item or field	Click the Help Topics button in the Help window, and then click the Index tab. Type the desired search keyword in the space provided. A list of topics that contain the search keyword appears.

Table 9. On-Line Help System

Creating a Backup Codeplug File

To create a backup file:

- Open the desired codeplug file if it is not already open.
- From the Codeplug menu, select Save As or click the 'Save to File' button on the Functionality Bar.
- In the File/Save As dialog box, navigate to the drive and folder (or directory) you want to save the file.
- Enter a new file name in the File name field and click OK to save the backup file.

After the installation, the CSS uses the installation directory as the default working archive. The user can specify the location where to locate a file or folder.

Reading Data from a File

Read data from a file as the following:

- From the Codeplug menu, choose Read From File, or click the 'Read from File' button on the Functionality Bar.
- In the File/Open dialog box, navigate to the drive and folder (or directory) where the codeplug file is located.
- Then double-click the desired file name, or highlight the file name and click OK.
- The CSS displays the codeplug data in the Content View.

After the installation, the CSS uses the installation directory as the default working archive. The user can specify the location where to locate a file or folder.

Reading Data from the Device

To read the Codeplug data from the device:

- Select Read Device from the Codeplug menu or click the 'Read from Device' button on the Functionality Bar.
- Wait while the tool is communicating with the device. After a few seconds, the CSS application will display the codeplug data in the Content View.

If an error occurs, refer to Appendix B, Troubleshooting Information.

CAUTION:
Never disconnect the programming cable or power off the device or PC during the reading process. Doing so might corrupt the codeplug data.

Saving Data to the File

To save the Codeplug data to the file, do the following:

- From the Codeplug menu, select Save.
- If this file is being saved for the first time, enter the desired file name and specify the directory where the file should be saved and click OK to complete the task.

After the installation, the CSS uses the installation directory as the default working archive. The user can specify the location where to locate a file or folder.

Writing Codeplug Data to the Device

To write the Codeplug data to the device:

- Select Write Device from the Codeplug menu or click the 'Write Device' button on the Functionality Bar.
- If an error occurs, refer to Appendix B, Troubleshooting Information.

CAUTION:
Never disconnect the programming cable or power off the device or PC during the writing process. Doing so might corrupt the codeplug data.

Printing Data from Codeplug

To print the Codeplug data do the following:

- Select Print from the Codeplug menu or click the 'Print' button on the Toolbar. (This option is available only if any codeplug is loaded into CSS.)
- In the Print dialog box, check to see if the correct printer is selected. If not, click the Setup button and choose the correct printer. Click OK to return to the Print dialog box.
- Next specify the Print range, quality, and number of copies (optional). Click OK to complete the task.

Printing the Codeplug Page

To print the current codeplug page:

- Click the 'Print page' button on the bottom of the current codeplug page.
- In the Print dialog box, check to see if the correct printer is selected. If not, click the Setup button and choose the correct printer. Click OK to return to the Print dialog box.
- Next specify the Print range, quality, and number of copies (optional). Click OK to complete the task.

Printing to a File

Use this command to print out a configuration to a text file, which could be read by Notepad, Word, or another application. The file is then accessible via CSS Codeplug menu for all users.

Appendix A: Keyboard Shortcuts

Any CSS function or action that can be performed using the mouse can also be performed using the keyboard keys. This includes accessing menu functions, navigating through the CSS, and changing field values.
The following is A list of shortcuts for frequently used CSS functions:

Press	To perform this action…
F1	Get help information
Tab	Navigate a cursor to the next data field
Shift+Tab	Return a cursor to the previous data field
Up Arrow	Increment an integer value of a data field
Down Arrow	Decrement an integer value of a data field
Left/Right Arrow	Move a cursor within a data field
Spacebar	Toggle the entry in the check box (that is, change Enabled to Disabled and vice versa)
Alt+Down Arrow	Open a drop-down list
Up/Down Arrow	Make a selection in an opened drop-down list
Ins	Toggle between overwrite and insert modes
Del	Erase a character under a cursor
BackSpace	Erase data within a field and move a cursor left
Ctrl+C	Close a codeplug file
Ctrl+O	Read a codeplug file
Ctrl+P	Print a codeplug file
Ctrl+S	Save a codeplug file
Ctrl+R	Read codeplug data from the device
Ctrl+W	Write codeplug data to the device
Right Arrow	Expand tree—Codeplug tree navigation
Left Arrow	Collapse tree—Codeplug tree navigation
F11	Navigate between Codeplug Tree and Codeplug Parameters

Table 10. Keyboard Shortcuts

Tips:
Use these shortcuts in situations where you cannot use a mouse (for instance, programming a device in the field). Refer to the “Keyboard Shortcuts” section in the on-line help for a list of spreadsheet and CSS navigation shortcuts.

Appendix B: Troubleshooting Information

If you see this message...	Do this:
Connection failed! Check for ... and try again	Check the hardware setup.
Can't open: file is not a valid...	The file you attempt to read is not the valid codeplug. Try reading another file.
Can't open: File doesn't exist or has been corrupted!	The file you are attempting to read does not exist. Please check its name and try again.
Can't save: data was not loaded	No files to save exist! This operation is illegal.
Invalid Open Parameter.	Please check your setup again. Selected comport is occupied by another device or does not exist.
Invalid File	There is an attempt to save an invalid file. Please check the file to be saved and try again
Access to the … is denied	You are attempting to re-write read-only file. Please check file attributes and try again.

Table 11. Troubleshooting Table

Note:
Many problems can be corrected if you create a backup codeplug file before modifying a codeplug. The backup file can be used to retrieve codeplug data if the original becomes corrupted.

Appendix C: Contact Information for Motorola Technical Support

Motorola has made every effort to ensure that the CSS is of excellent quality. However, if you experience any problems with the product, we suggest that you refer to the following sources:

- This guide, designed to help you install CSS and gives an overview of the CSS.
- The on-line help which has detailed explanations.

Customer Service

If you encounter a problem, check your hardware setup. If the problem cannot be resolved, please call the System Support Center (1-800-448-3245), Monday through Friday. Please have the following information ready when you call:

- Nature and description of the problem
- When the problem occurred and what specific actions led to it
- Type of PC, manufacturer, version and type of operating system, memory size, disk space
- CSS version, radio modem type, and software version

System Support Center – Toll-free	1-800-448-3245
Address	Motorola, Inc. System Support Center 1301 E. Algonquin Road Schaumburg, IL 60173

Appendix D: Acronyms and Abbreviations

The following acronyms and abbreviations are used in this document and the CSS:

APCO	Association of Public Safety Communication Officials
CAI	Common Air Interface
CSS	Configuration Service Software
DIU	Digital Interface Unit
DSP	Digital Signal Processor
E&M	Ear & Mouth
EMC	Encryption Module Cartridge
FDMA	Frequency Division Multiple Access
FIPS	Federal Information Processing Standards
HLGT	High Level Guard Tone
LLGT	Low Level Guard Tone
MRTI	Mobile Radio Telephone Interface
PC	Personal Computer
RNC	Radio Network Controller
RX	Receive
SN	Serial Number
TRC	Tone Remote Control
TX	Transmit

Appendix E: Glossary

Access Code
A preprogrammed network access code transferred on the radio channel that allows private communication between end users. The access code may be PL, DPL, Single Tone, DTMF, MDC1200 or ASTRO N word.

Alias (of a key index)
An additional name consisting of alphanumeric characters, that conveniently identifies the key index (otherwise identified by a number).

Archive
A computer disk file that contains the codeplug data of a particular DIU.

ASTRO™
MOTOROLA Trademark for Commercial Government Industrial Solution Sector's FDMA digital radio system.

Backup Files
Additional copies of the archive files used when the original archive files are lost or erased.

BPS
A basic unit of data transmission, equal to the number of bits passing a point per seconds.

Codeplug
Data stored in the DIU's non-volatile memory and includes parameters to be used in its operation.

COM
The logical names of the standard serial port available on IBM-PC computers.

Device
The ASTRO DIU / Console device to be programmed by the CSS.

Download
The transfer of parameter information into the DIU device.

Dual-tone
A TRC command that consists of two tones.

Flash Memory
A type of non-volatile programmable solid-state memory device.

Function Keys
The keys at the left or the top of the keyboard, labeled F1-F10.

Appendix E: Glossary (Cont.)

HLGT
High Level Guard Tone. Enables the function tone detect circuit in a TRC base station. First tone in transmit sequence.

LLGT
Low Level Guard Tone. Tone that keeps a TRC base station keyed. Preceded by HLGT and a function tone(s).

Multikey
An ability of the ASTRO devices to be equipped with multiple different encryption keys.

Multiple Algorithms
An ability of the ASTRO devices to be equipped with two hardware-based algorithms. This feature supports interoperability and migration.

Port
A hardware interface that the computer uses to communicate with other devices.

Single-tone
A TRC command that consists of a single tone.

SmartZone™
A trunking system using multiple sites with a variable number of repeaters to cover large geographic areas.

SmartNet™
A standard trunking site that includes the Central Controller, the Base Station, and the Dispatcher Unit (console).

Template
Codeplug data used as a “master" to copy (program) to other devices.

Trunking™
A system that automatically and dynamically allocates a number of frequencies to a larger number of users, supplying rapid system access and optimum spectrum efficiency.

Upload
The transfer of parameter information from the DIU device.