

# User Guide

**CSI-380**

**Signaling Specification**



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## Notice

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## Overview

Meridian Tm Digital Centrex (MDC) provides advanced telecommunications features for sophisticated business users. MDC offers its customers advanced telecom services such as Multi-line Service, Call Hold, Call Forward, Speed Dial, and Call Transfer through software packages installed and maintained at the Central Office.

MDC services are implemented by way of a proprietary signaling method enabling M5000 Series telephone sets, the CSI-380 Centrex Serial Interface, and the DMS-100™ Central Office Switch to communicate detailed call signaling and display information. This information forms the basis of MDC feature implementation. The M5000 Series telephone set is also called a Meridian Business Set (MBS), or a P-phone.

MDC features such as Hold, Release, Transfer, Speed Dial, and Conference are all activated at the Central Office as a result of a key pressed on the telephone. All M5000 Series telephone sets have a standard key arrangement that includes digits 0-9, \*, #, Hold, Release, and a number of Feature Keys. The Feature Keys are used to activate MDC services and may differ from set to set. The Central Office keeps a profile of each set which includes Feature Key assignment, thus the signaling commands sent to the Central Office are always the same for each key but the feature that each key activates may be different.

The CSI-380 enables a computer application to send and receive MDC call signaling and display information on a Meridian Digital Centrex line, allowing the computer applications programmer full access to all MDC services and features that are available on M5000 Series telephone sets. The CSI-380 may only be used with an M5000 Series telephone set or on a line configured for use with an M5000 Series telephone set.

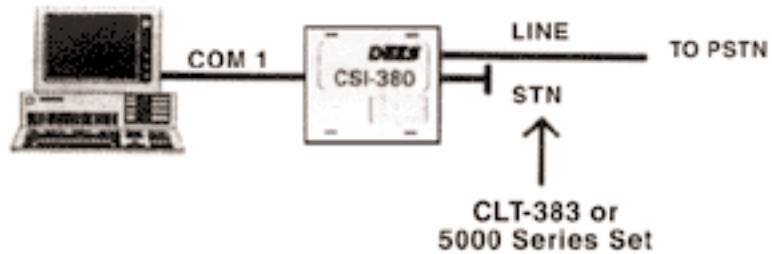
## Installation

Connect the telephone line cord from the wall outlet to the LINE jack on the CSI380. If you have an MBS telephone set such as a 5209 or 5312, connect the telephone cord from the telephone to the STATION SET jack on the CSI-380. If you are using the CSI-380 without a telephone set attached, connect a Dees CLT-383 Centrex Line Termination to the STATION SET jack on the CSI-380. Connect a standard serial cable from the serial port of your computer to the RS232C port on the CSI-380. Connect the power supply to the POWER jack on the CSI-380 and plug in the power supply to the wall outlet.

Configure the serial port on your computer for 2400 baud, no parity, 8 data bits, 1 stop bit, half duplex transmission. If you want to test communications between the PC and the CSI-380, use a terminal emulation program such as PROCOMM PLUS® or Microsoft® Windows™ Terminal. Load the program and configure your serial port, then unplug and plug in the power supply for the CSI-380. On your screen you should see:

```
RESET  
OK
```

This indicates that the PC and the CSI-380 are communicating with each other.



## Command Echoing

The CSI-380 may be programmed to echo commands back to the PC (default) or to not echo commands back to the PC. To program the CSI-380 to not echo commands back to the PC, the following command must be sent. At the PC keyboard, type:

```
ATE0<cr>
```

where <cr> means the Enter key on your keyboard. The CSI-380 will respond with:

```
OK
```

To program the CSI-380 to echo commands back to the PC (the default setting), the following command must be sent. At the PC keyboard, type:

```
ATE1<cr>
```

The CSI-380 will respond with:

```
OK
```

## CSI-380 Operation

### Modes of Operation

The CSI-380 may be used in either one of two modes of operation: Normal Operation (with an MBS telephone) or Standalone (without an MBS telephone). Normal Operation means that there is an MBS telephone attached to the CSI-380, and that the computer will be used to monitor and enhance the telephone. Standalone Operation means that there is no telephone attached to the CSI-380, and that the computer will be used to replace the telephone or to monitor Central Office commands.

### Initialization in Normal Operation

The CSI-380 must be initialized in order to prepare it for use on the MDC telephone line. If you are using the CSI-380 with an MBS telephone (Normal Operation), then you must send it one initialization string. At the PC keyboard, type:

```
ATS93=2<cr>
```

where <cr> means the Enter key on your keyboard. The CSI-380 will respond with:

```
OK
```

If you want to verify that the CSI-380 has been initialized, then at the PC keyboard, type:

```
ATS93?<cr>
```

The CSI-380 should respond with:

```
002  
OK
```

indicating that the CSI-380 has been initialized.

### Initialization in Standalone Operation

If you are using the CSI-380 **without an MBS telephone** (Standalone Operation), then you must send it four initialization strings. At the PC keyboard, type:

```
ATS90=1<cr>  
ATS91=1<cr>  
ATS93=2<cr>  
ATS94=1<cr>
```

where <cr> means the Enter key on your keyboard. If you want to verify that the CSI-380 has been initialized, then at the PC keyboard, type:

```
ATS90?<cr>
```

The CSI-380 should respond with:

```
001  
OK
```

indicating that the CSI-380 has been initialized. This may be repeated for all initialization strings.

Table 1 is a summary of CSI-380 Initialization Commands.

## Meridian Digital Centrex Commands

When the handset of an MBS telephone is lifted off-hook, the telephone transmits a special off-hook code to the central office indicating that the receiver is off-hook. In response to this, the Central Office sends a series of commands back to the telephone, such as Indicator 1 On and Handset On. The CSI-380 is used to monitor these commands as they are exchanged between the telephone and the Central Office, or it is used to send commands to the Central Office along with or instead of a telephone.

Every command sent to the Central Office by the telephone or by the computer will produce a particular response by the Central Office, depending on the command, and every command sent by the Central Office will produce a particular response in the telephone. These may be used by the computer to monitor and control the call, activate and respond to MDC features, and receive calling party information. The computer may be used to dial numbers, activate stored speed dial numbers, use MDC features such as Call Hold, Call Forward, and Transfer, and to display on the screen or pass to a software application information about calling parties, such as their name and telephone number. Commands are sent from the computer to the Central Office in the following format:

```
AT^XXX<cr>
```

where 'A' is the circumflex character and 'XXX' is the three digit MDC command code. If the command has been sent by the CSI-380 and received by the Central Office correctly, the CSI-380 will reply with:

```
OK
```

**Note** that all strings sent from the CSI-380 to the computer are terminated by a carriage return.

MDC commands are divided into three groups: Call Signaling commands, Display commands, and Display Character codes, used to put text information on the computer screen or the display of the telephone. All commands are described in the following sections.

**Note** that there may be additional codes appearing on the MDC line that are not listed in this specification. These codes are intended for devices other than an MBS telephone and should be ignored.



## Call Signaling Commands

### Telephone to Central Office Call Signaling Commands

The commands listed in Tables 2 and 3 describe all the signaling codes that will be sent by the telephone if the appropriate key is pressed or if the phone is taken off-hook.

### Central Office to Telephone Call Signaling Commands

The commands listed in Tables 4 and 5 describe all the signaling codes that will be sent by the Central Office in response to incoming calls, to keys pressed on the telephone, or to codes sent by the computer. The purpose of each code describes the action taken by the telephone, the meaning that an applications program may derive from the code, or the action that should be taken by an applications program in a Standalone configuration.

Through the use of the Indicator Signaling commands, the Central Office controls the indicators on the telephone, and communicates to the user the state of a particular line or feature. If a Feature Key is assigned a Directory Number, the associated indicator represents the state of the telephone line for that number. Off means the line is on-hook and idle, Wink means the line is on hold, Flash means the line is ringing, and On means the line is off-hook and active. If a Feature Key is assigned to a specific feature, such as Call Forward, then the indicator states describe functions about the feature.

The three reset commands are used by the Central Office to place the telephone (or applications program) into a known state. Soft Reset sets the telephone back to idle, Save Indicator Reset does the same thing but doesn't turn off the indicators, and Hard Reset is equivalent to unplugging and plugging in the telephone.

The **Alert On** and **Alert Off** commands are used to indicate that the line is ringing. Alert On means the line is ringing, and Alert Off means the line has stopped ringing because the call has been answered or because the caller hung up.

The **Buzzer On** and **Buzzer Off** commands are used to indicate a line is ringing when the phone is currently off-hook, or can be used in conjunction with some features. These commands cause the buzzer in the phone to turn on and off. The Voice On and Voice Off commands control the line monitor in the phone. They are used for on-hook dialing and other features.

The **Handset On** and **Handset Off** commands are used to enable the phone's handset electronics. These commands are typically part of the Central Office response to On-hook and Off-hook commands sent by the phone or computer.

The **Handsfree On** and **Handsfree Off** commands are used to control hands free phones in conjunction with some MDC features. They will not be sent if the line is not configured for use with a hands free telephone.

**Echo Mode** is used by the Central Office as part of automatic line diagnostic routines. While a device is in Echo Mode, any command received from the Central Office is not acted on but is sent back (echoed) to the Central Office. The exceptions to this are the receipt of a Reset command or the Close Echo Mode command, any of which will cause Echo Mode to be closed. If your installation is configured for Normal Operation (CSI-380 with a telephone) then any applications software must not respond to Open Echo Mode or Close Echo Mode commands. If your installation is configured for Standalone Operation (no attached telephone) then the CSI-380 may be set to respond automatically to Open Echo Mode and Close Echo Mode commands, or the applications software may be responsible for implementing the Echo Mode requirements. In most standalone situations, it is best that the CSI-380 be set to handle Echo Mode. This is accomplished by setting the contents of S-register 91 to a 1. In addition, the computer must not attempt communications with the CSI-380 while either it or the phone are in Echo Mode. To assist in this, the CTS line on the CSI-380 will go false during Echo Mode.

## Display Commands and Characters

The display used on a M5000 Series telephone set consists of 2 lines with 24 characters each. There are a number of commands associated with the way character information is written to the display and to indicate how dialed digits are put on the display. The display buffer holds all character information to be put on the display. Enabling the display causes characters in the buffer to be shown on the display. If the display is enabled, any buffer commands will be immediately reflected in the display. If the MDC line is not configured for use with a display phone, display commands may not be sent.

## Display Signaling Commands

Characters are written to the buffer in either Normal Display Mode or Digit Display Mode. In Normal Display Mode, the Central Office sends character information to the telephone or computer to be put on the display. Characters are displayed at the current cursor location, the cursor location is incremented after each character is entered, and the cursor wraps from Line 2 Column 24 to Line 1 Column 1. In Digit Display Mode all dial pad key presses cause the digit to appear in the display buffer at the current cursor location, the cursor location is incremented after each digit, and the display shifts left one position when a digit is entered at Line 2 Column 24.

Tables 6 and 7 describe all Display Signaling commands.

## Transmit Display Status

The Transmit Display Status (TDS) command is used by the Central Office as part of automatic line diagnostic routines and to determine if a phone is capable of displaying character information.

- If you are configured for Normal Operation (CSI-380 with a telephone) and the telephone has a working display, any applications software must not respond to the TDS command.
- If you are configured for Standalone Operation (no attached telephone), the applications software must respond to the TDS command with the appropriate Display Status command or handled by the CSI as a result of setting S91 = 1.

## Display Character Codes

Characters that may be displayed are a subset of the ASCII character set. Table 8 is list of the valid ASCII characters and their corresponding MDC codes that may be sent by the Central Office.

## Network Command Reference

The hex codes listed in the following tables are the actual codes which are transmitted between the phone, CSI-380 and the Central Office. The CSI-380 reports these codes to the computer as a sequence of ASCII characters representing the code. For example, if the off-hook code 01C is sent by the telephone, the CSI-380 reports this as the 3 characters 0,1 and C.

### CSI-380 Initialization Commands

| Keyboard Command | Purpose   | CSI-380 Response |
|------------------|---|------------------|
| ATE0             | Do not echo PC commands.                                    | OK               |
| ATE1             | Echo PC commands (Default).                                 | OK               |
| ATS90=0          | No acknowledge (Default).                                   | OK               |
| ATS90=1          | Acknowledge for phone.                                      | OK               |
| ATS91 =0         | Do not support echo mode and TDS. (Default)                 | OK               |
| ATS91=1          | Support echo mode and TDS.                                  | OK               |
| ATS93=2          | Initialize CSI-380  | OK               |
| ATS94=0          | Normal Operation (Default).                                 | OK               |
| ATS94=1          | Standalone Operation.                                       | OK               |
| ATS94?           | Request S-register contents.<br>Works with any ATS command. | (contents)<br>OK |

Table 1

### Hookswitch and Dial Pad Codes Sent By Telephone or Computer

| Command        | Hex Code | If sent by phone                   | If typed at keyboard               |
|----------------|----------|------------------------------------|------------------------------------|
| Off-hook       | 01C      | Telephone has been taken off-hook. | Computer has seized line.          |
| On-hook        | 01D      | Telephone has been placed on-hook. | Computer has released line.        |
| Dial Pad Key 1 | 008      | Digit 1 dialed by phone.           | Digit 1 dialed by computer.        |
| Dial Pad Key 2 | 009      | Digit 2 dialed by phone.           | Digit 2 dialed by computer.        |
| Dial Pad Key 3 | 00A      | Digit 3 dialed by phone.           | Digit 3 dialed by computer.        |
| Dial Pad Key 4 | 00C      | Digit 4 dialed by phone.           | Digit 4 dialed by computer.        |
| Dial Pad Key 5 | 00D      | Digit 5 dialed by phone.           | Digit 5 dialed by computer.        |
| Dial Pad Key 6 | 00E      | Digit 6 dialed by phone.           | Digit 6 dialed by computer.        |
| Dial Pad Key 7 | 010      | Digit 7 dialed by phone.           | Digit 7 dialed by computer.        |
| Dial Pad Key 8 | 011      | Digit 8 dialed by phone.           | Digit 8 dialed by computer.        |
| Dial Pad Key 9 | 012      | Digit 9 dialed by phone.           | Digit 9 dialed by computer.        |
| Dial Pad Key 0 | 015      | Digit 0 dialed by phone.           | Digit 0 dialed by computer.        |
| Dial Pad Key * | 014      | Digit * dialed by phone.           | Digit * dialed by computer.        |
| Dial Pad Key # | 016      | Digit dialed by phone.             | Digit dialed by computer.          |
| HOLD Key       | 0013     | HOLD key pressed at phone.         | HOLD key code sent by computer.    |
| RELEASE Key    | 00F      | RELEASE key pressed at phone.      | RELEASE key code sent by computer. |

Table 2

**Feature Key Codes  
Sent By Telephone  
or Computer**

| <b>Command</b> | <b>Code</b> | <b>If sent by phone</b>  | <b>If typed at keyboard</b>            |
|----------------|-------------|--------------------------|--|
| Feature Key 1  | 000         | F1 key pressed at phone. | F1 feature key code sent by computer.  |
| Feature Key 2  | 001         | F2 key pressed at phone. | F2 feature key code sent by computer.  |
| Feature Key 3  | 002         | F3 key pressed at phone. | F3 feature key code sent by computer.  |
| Feature Key 4  | 003         | F4 key pressed at phone. | F4 feature key code sent by computer.  |
| Feature Key 5  | 004         | F5 key pressed at phone. | F5 feature key code sent by computer   |
| Feature Key 6  | 005         | Digit 6 dialed by phone. | F6 feature key code sent by computer.  |
| Feature Key 7  | 006         | Digit 7 dialed by phone. | F7 feature key code sent by computer.  |
| Feature Key 8  | 007         | Digit 8 dialed by phone. | F8 feature key code sent by computer.  |
| Feature Key 9  | 008         | Digit 9 dialed by phone. | F59 feature key code sent by computer. |
| Feature Key 10 | 017         | Digit 0 dialed by phone. | F10 feature key code sent by computer. |

**Table 3**

**Indicator Signaling  
Codes Sent By the  
Central Office**

| <b>Indicator No.</b> | <b>Code</b> | <b>Purpose</b>     |
|----------------------|-------------|--------------------|
| <b>1</b>             | 800         | Indicator 1 Off    |
|                      | 820         | Indicator 1 Wink   |
|                      | 840         | Indicator 1 Flash  |
|                      | 860         | Indicator 1 On     |
| <b>2</b>             | 801         | Indicator 2 Off    |
|                      | 821         | Indicator 2 Wink   |
|                      | 841         | Indicator 2 Flash  |
|                      | 861         | Indicator 2 On     |
| <b>3</b>             | 802         | Indicator 3 Off    |
|                      | 822         | Indicator 3 Wink   |
|                      | 842         | Indicator 3 Flash  |
|                      | 862         | Indicator 3 On     |
| <b>4</b>             | 803         | Indicator 4 Off    |
|                      | 823         | Indicator 4 Wink   |
|                      | 843         | Indicator 4 Flash  |
|                      | 863         | Indicator 4 On     |
| <b>5</b>             | 804         | Indicator 5 Off    |
|                      | 824         | Indicator 5 Wink   |
|                      | 844         | Indicator 5 Flash  |
|                      | 864         | Indicator 5 On     |
| <b>6</b>             | 805         | Indicator 6 Off    |
|                      | 825         | Indicator 6 Wink   |
|                      | 845         | Indicator 6 Flash  |
|                      | 865         | Indicator 6 On     |
| <b>7</b>             | 806         | Indicator 7 Off    |
|                      | 826         | Indicator 7 Wink   |
|                      | 846         | Indicator 7 Flash  |
|                      | 866         | Indicator 7 On     |
| <b>8</b>             | 807         | Indicator 8 Off    |
|                      | 827         | Indicator 8 Wink   |
|                      | 847         | Indicator 8 Flash  |
|                      | 867         | Indicator 8 On     |
| <b>9</b>             | 813         | Indicator 9 Off    |
|                      | 833         | Indicator 9 Wink   |
|                      | 853         | Indicator 9 Flash  |
|                      | 873         | Indicator 9 On     |
| <b>10</b>            | 81 E        | Indicator 10 Off   |
|                      | 83E         | Indicator 10 Wink  |
|                      | 85E         | Indicator 10 Flash |
|                      | 87E         | Indicator 10 On    |

**Table 4**

**Call Signaling  
Codes Sent by the  
Central Office**

| <b>Command</b>       | <b>Code</b> | <b>Purpose</b>  |
|----------------------|-------------|---|
| Soft Reset           | 808         | Reset telephone to idle condition.  |
| Save Indicator Reset | 848         | Reset telephone to idle but do not turn indicators off.                             |
| Hard Reset           | 868         | Reset telephone to idle. Equivalent to power up reset.                              |
| Alert On             | 86F         | Start ringing the telephone.  |
| Alert Off            | 80F         | Stop ringing the telephone.   |
| Buzzer On            | 86E         | Turn on the telephone's buzzer.   |
| Buzzer Off           | 80E         | Turn off the telephone's buzzer.  |
| Handset On           | 86D         | Turn on the telephone's handset.  |
| Handset Off          | 80D         | Turn off the telephone's handset.   |
| Voice On             | 86C         | Turn on the telephone's line monitor.   |
| Voice Off            | 80C         | Turn off the telephone's line monitor.  |
| Handsfree On         | 86B         | Turn on the telephone's speaker and microphone.                                     |
| Handsfree Off        | 80B         | Turn off the telephone's speaker and microphone.                                    |
| Open Echo Mode       | 869         | Echo all commands back to Central Office except Reset and Close Echo Mode commands. |
| Close Echo Mode      | 809         | Stop echoing commands from Central Office.  |

**Table 5**

**Display Signaling  
Codes Sent By the  
Central Office**

| <b>Command</b>                 | <b>Code</b> | <b>Purpose</b>  |
|--------------------------------|-------------|---|
| Clear Buffer                   | 8A9         | Clears the buffer of all character information.   |
| Clear Display                  | 8AD         | Clears the buffer and the display of all character information.   |
| Clear Buffer Line 1            | 889         | Clears the top line of the buffer.  |
| Clear Buffer Line 2            | 899         | Clears the bottom line of the buffer.   |
| Enable Digit<br>Display Type 1 | 89B         | Causes dialed digits to appear in the buffer at the current cursor location. At the first digit entry, clears the buffer and display and sets the cursor to Line 2 Column 1. When Line 2 is filled, all digits are shifted left one position.                                 |
| Enable Digit<br>Display Type 2 | 8AB         | Causes dialed digits to appear in the buffer at the current cursor location. At the first digit entry, clears Line 2 of the buffer and display and sets the cursor to Line 2 Column 1. When Line 2 is filled, Line 1 is cleared and all digits are shifted left one position. |
| Clear Buffer 12 Sec.           | 8139        | Causes the phone to clear its buffer after In 12 seconds.   |
| Disable Display<br>Cursor      | 88C         | Turns off the visible cursor.   |
| Disable Display<br>Echoing     | 88B         | Sets phone to Normal Display Mode.  |
| Disable Display                | 88D         | Turns off the display. Characters in the buffer are not shown on the display.   |
| Power Down                     | 898         | Turns off the display. Characters in the Display buffer are not shown on the display.   |
| Enable Display                 | 89D         | Turns on the display. Any characters in the buffer are shown on the display.  |
| Enable Display<br>Cursor       | 89C         | Turns on the visible cursor.  |
| Display Reset                  | 888         | Buffer and display are cleared, cursor is disabled and set to Line 1 Column 1, Normal Display Mode is used, display is powered down.  |
| Resume Digit Display           | 8BB         | Resume digit display of the type most recently disabled.  |
| Cursor to Line 1<br>Col 1      | 8A5         | The cursor position is set to Line 1 Column 1.  |
| Cursor to Line 2<br>Col 1      | 8B5         | The cursor position is set to Line 2 Column 1.  |
| Transmit Display               | 8B7         | Transmit the current display status.  |

**Table 6**

**Display Status Codes  
Sent By the Telephone  
or Computer**

| <b>Command</b>        | <b>Code</b> | <b>Purpose</b>   |
|-----------------------|-------------|--|
| Display Status Normal | 030         | The phone or computer has not been reset since the last time Transmit Display Status was sent by the Central Office. |
| Display Status Reset  | 034         | The phone or computer has been reset since the last time Transmit Display Status was sent by the Central Office.     |

**Table 7**

Character Codes Sent  
by the Central Office

| Char | Meaning     | ASCII Hex Value | MDC Hex Code | Char | Meaning             | ASCII Hex Value | MDC Hex Code |
|------|-------------|-----------------|--------------|------|---------------------|-----------------|--------------|
| A    | Uppercase A | 41              | E1           | 7    | Seven               | 37              | D7           |
| B    | Uppercase B | 42              | E2           | 8    | Eight               | 38              | D8           |
| C    | Uppercase C | 43              | E3           | 9    | Nine                | 39              | D9           |
| D    | Uppercase D | 44              | E4           | SP   | Space               | 20              | C0           |
| E    | Uppercase E | 45              | E5           | !    | Exclamation Mark    | 21              | C1           |
| F    | Uppercase F | 46              | E6           | "    | Quotation Mark      | 22              | C2           |
| G    | Uppercase G | 47              | E7           | #    | Octathorpe          | 23              | C3           |
| H    | Uppercase H | 48              | E8           | \$   | Dollar Sign         | 24              | C4           |
| I    | Uppercase I | 49              | E9           | %    | Percent Sign        | 25              | C5           |
| J    | Uppercase J | 4A              | EA           | &    | Ampersand           | 26              | C6           |
| K    | Uppercase K | 4B              | EB           | '    | Apostrophe          | 27              | C7           |
| L    | Uppercase L | 4C              | EC           | (    | Opening Parenthesis | 28              | C8           |
| M    | Uppercase M | 4D              | ED           | )    | Closing Parenthesis | 29              | C9           |
| N    | Uppercase N | 4E              | EE           | *    | Asterisk            | 2A              | CA           |
| O    | Uppercase O | 4F              | EF           | +    | Plus Sign           | 2B              | CB           |
| P    | Uppercase P | 50              | FO           | ,    | Comma               | 2C              | CC           |
| Q    | Uppercase Q | 51              | F1           | -    | Hyphen (Minus)      | 2D              | CD           |
| R    | Uppercase R | 52              | F2           | .    | Period              | 2E              | CE           |
| S    | Uppercase S | 53              | F3           | /    | Slant (Slash)       | 2F              | CF           |
| T    | Uppercase T | 54              | F4           | :    | Colon               | 3A              | DA           |
| U    | Uppercase U | 55              | F5           | ;    | Semicolon           | 3B              | DB           |
| V    | Uppercase V | 56              | F6           | <    | Less Than           | 3C              | DC           |
| W    | Uppercase W | 57              | F7           | =    | Equals              | 3D              | DD           |
| X    | Uppercase X | 58              | F8           | >    | Greater Than        | 3E              | DE           |
| Y    | Uppercase Y | 59              | F9           | ?    | Question Mark       | 3F              | DF           |
| Z    | Uppercase Z | 5A              | FA           | @    | Commercial At       | 40              | EO           |
| 0    | Zero        | 30              | DO           | [    | Left Bracket        | 5B              | FB           |
| 1    | One         | 31              | D1           | \    | Reverse Slant       | 5C              | FC           |
| 2    | Two         | 32              | D2           | ]    | Right Bracket       | 5D              | FD           |
| 3    | Three       | 33              | D3           | ^    | Circumflex          | 5E              | FE           |
| 4    | Four        | 34              | D4           | _    | Underscore          | 5F              | FF           |
| 5    | Five        | 35              | D5           |      |                     |                 |              |
| 6    | Six         | 36              | D6           |      |                     |                 |              |

Table 9

## Computer Command Reference

### General

#### Command Line Structure

Command lines have the following structure:

HEADER - BODY - TERMINATOR

#### Command Header (AT)

All commands must be preceded by the letters AT. Upper or lower case is acceptable, but mixed case will not work.

#### Command Body

The command body is made up of one or more commands, each command having a command symbol and a parameter. Some commands may be invoked with others on the same command line. Some commands must be the only one on the command line. See the command list following.

#### Spaces

For readability spaces may be added to the command line between commands or anywhere in the D command. They are ignored.

#### Command Terminator (default is carriage return <RTN>)

Each command line must end with a command terminator. The terminator can be modified, but it defaults to ASCII 13d, which is a carriage return or the ENTER key on a PC keyboard.

#### Maximum Length

The maximum length of the command line is 35 characters including header, body, spaces, and terminator.

### EIA-602 Commands

#### AT

This is the command header. Issuing this by itself (no command body) will cause the 372 to return the OK result code.

#### A/

The A/ command repeats the previously issued command. It may be repeated as many times as desired. No command terminator is necessary.

#### E

The E (echo) command turns on echoing of commands back to the computer. Enabled by EI, disabled by EO. Factory default is EI. Backed up in eprom.

#### Q

The Q (quiet) command turns off result codes. Enabled (no codes reported) by Q1, disabled by Q0. Factory default is Q0. Backed up in eprom.

## **V**

The V (verbose) command sets result codes to text rather than digits. Enabled by V1, disabled by V0. Factory default is V1. Backed up in eeprom.

## **SX=Y**

The Sx=y command sets the contents of register x to value y. All S-Registers are backed up in eeprom. The value must be specified in decimal.

## **SX?**

The Sx? command returns the value of the specified register x in decimal format.

## **D**

The D command is used to dial digits. If the line is on-hook, receipt of the D command will cause the CSI-380 to seize the line on the key specified by S81 (AT\_K) and wait for dialtone. When dialtone is detected, the specified digits are dialed. If the line is off-hook, receipt of the D command will cause the 372 to dial the specified digits. The D may be followed by any combination of digits and other characters. All digits are dialed, a comma causes a pause, all other characters are ignored. If AT\_K=0 has been issued, ATD will return the ERROR result code. This command must be the sole command on the command line, except for the T or P command if immediately after the D character.

E.g.: ATD 1 (604) 946-8433  
ATD16049468433  
ATD 9, 946-8433

## **H**

The H (hookswitch) command controls line seizure. H0 goes on-hook, H1 goes off-hook. H1 goes off-hook on the line specified by S81 (AT\_K). H is the same as H0. Must be the sole command on the command line.

## **&F**

Restores all eeprom settings to the factory defaults.

## **P**

No action.

## **T**

No action.

## Rochelle CTI Commands

### **\_C0**

Returns 372 capabilities in Rochelle CTI format.

### **\_C1**

Returns product code in Rochelle CTI format.

### **\_C2**

Returns firmware release date in Rochelle CTI format.

### **\_C3**

Returns maximum number of lines supported in Rochelle CTI format.

### **C4**

Returns Rochelle CTI message types supported.

### **\_R0=n**

Output Register mode command. When n = 0, 372 provides notification of network events on a polled basis via the **\_Sn** command. When n = 1, 372 provides notification of network events on an interrupt basis. Factory default is n=0. Backed up in eeprom.

### **\_Sn**

Provide status for line n. If n=0, provides status for all lines.

## CCI-372 Specific Commands

### **\_P=**

Set PDN line definitions. Must be the sole command on the command line. Setting can be read via S83.

### **\_M=**

Set MADn line definitions. Must be the sole command on the command line. Settings can be read indirectly via S82 and S83.

### **\_K=**

Set dialing key definition. Must be the sole command on the command line. Setting can be read via S81.

### **^XXX**

Send xxx MDC code to the network. Must be the sole command on the command line.

## S-Registers

| Register | Description  | Default    |
|----------|--|------------|
| 3        | Command Terminator   | 13d        |
| 4        | Line feed character  | 10d        |
| 5        | Backspace character  | 8d         |
| 6        | Wait for dialtone in seconds before NO DIALTONE result code is issued  | 2d         |
| 8        | Pause time for comma character in ATD command  | 2d         |
| 81       | The line key to dial out on. Read Only.  | 1d         |
| 82       | The line appearance definitions. Binary 1 means line key defined. Right-most bit is Key 1. Read Only.  | 0000 0001b |
| 83       | The line type definitions. Binary 0 means MADN for that line key. Binary 1 means PDN for that line key. Right-most bit is Key 1. Read only.  | 0000 0000b |
| 90       | MDC addresses to send acknowledgments to. Right-most bit is Address 0.   | 0000 0000b |
| 91       | MDC addresses to respond to echo mode and TDS commands. Right-most bit is Address 0.   | 0000 0000b |
| 92       | Delay between transmitted MDC messages. Delay is:<br>$messages/sec = \frac{1}{0.0005 \times Delay\_value + 0.018}$   | 255d       |
| 93       | Format of raw MDC message reporting.<br>Valid for CSI- 380 only. Set to 0 in CCI-372.<br>0 - no messages reported.<br>1 - all messages reported with control bits.<br>2- valid messages reported with no control bits. Open Echo, Close Echo, Transmit Display Status not reported. Messages received on supported open echo channel not reported. | 0d         |
| 94       | Enable standalone mode. Set to 0 for p-phone attached. Set to 1 for CLT-383 attached.  | 0d         |
| 95       | The time from the last MDC character received to when the indicator goes to flashing or to on, when the display characters come before the indicator command:<br>$EARLY\_ICLID\_TIME = (value \times 0.02)sec$   | 50d        |
| 96       | The time from when the indicator goes to flashing or to on to when the first MDC character is received, when the indicator command comes before the display characters:<br>$LATE\_ICLID\_TIME = (value \times 0.02)sec$  | 125d       |
| 97       | The maximum time between display characters before the 372 considers the display sequence complete:<br>$INTER\_ICLID\_TIME = (value \times 0.02)sec$   | 25d        |

Table 10

**Command Result Codes**

Responses to commands are one of three result codes: OK (0), ERROR (2), and NO DIALTONE (6). The V command may be used to turn text result codes into the digit result codes shown in parentheses. The Q command may be used to disable the sending of result codes.

**Unsolicited Event Messages**

Unsolicited event messages are a part of the Rochelle CTI command set. Two message types exist.

**CND Event Message**

This message reports the calling number and name if available, and the line number the call came in on. The line number may be 1 to 8 and must be deferred by the \_P= command. The message format is:

+ 1, <number>, <name>, <line>

**Line Status Event Message**

This message reports line status changes. The line number may be 1 to 8 and must be defined by the \_P= command. The message format is:

+2,<new status>,<Line>

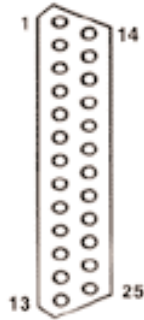
where <new status> will be one of the following:

- 0 - line is idle
- 1 - line is ringing, ringing period
- 2 - line is ringing, silent period
- 3 - line is off-hook on incoming call
- 4 - line is off-hook on outgoing call

## Connector Pinouts

### RS-232C Connector

DB25 Socket



- 1 Shield Ground
- 2 Transmit Data (To CSI-380)
- 3 Receive Data (From CSI-380)
- 4 Request to Send (To CSI-380)
- 5 Clear to Send (From CSI-380)
- 6 Data Set Ready (Internal to pin 20 and 8)
- 7 Signal Ground
- 8 Carrier Detect (internal to pin 20 and 6)
- 20 Data Terminal Ready (internal to pin 6 and 8)

### Power Connector

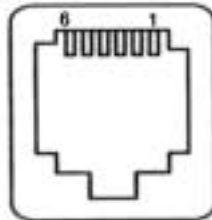
Barrel connector  
2.5 mm ID  
5.5 mm OD



Inner Connector - Ground  
Outer Connector - +24Vdc

### Line Connector

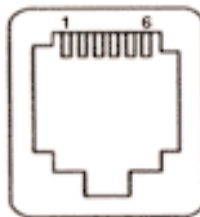
6 position  
6 conductor  
Modular Jack



- 1 Set Connector Pin 1
- 2 Set Connector Pin 2
- 3 Tip
- 4 Ring
- 5 Set Connector Pin 5
- 6 Set Connector Pin 6

### Set Connector

6 position  
6 conductor  
Modular Jack



- 1 Line Connector Pin 1
- 2 Line Connector Pin 2
- 3 Ring
- 4 Tip
- 5 Line Connector Pin 5
- 6 Line Connector Pin 6



## Warranty and Service

Dees Communications warrants equipment manufactured by it to be free from defective material and workmanship for a period of one year. At its option, Dees shall replace or repair such equipment, which under normal use and service, discloses such defects. This warranty shall not apply to fuses. Equipment under warranty shall be returned to Dees' designated facility, transportation prepaid by the purchaser, for inspection by Dees, whose opinion as to defects shall be conclusive.

The warranty period shall commence on the date of shipment which shall be deemed to be the date of final calibration marked on the equipment.

This warranty period shall be void as to any products which have been repaired, worked upon or altered by persons not authorized by Dees, or which have been subject to misuse, negligence, accident or abnormal conditions of operations, i.e., lightning, earthquake, tornado. In all such cases, such repairs shall be billed at a nominal cost, and an estimated charge will be provided before work is begun. This warranty shall not apply to any of our products which have been connected, installed, used or adjusted otherwise in accordance with the instructions furnished by us. Such units shall be returned to the customer.

If you experience problems while installing this product, or if this product stops functioning, please call Dees Technical Support. If the problem cannot be resolved on the phone, return the product(s) to Dees. A material return authorization number must be secured prior to return shipment by calling Dees.

You can reach Technical Support by calling the following number:

**1-800-654-5604**

Goods should be returned to the following address:

**4130 148th Avenue NE  
Redmond, WA 98052  
USA**

Repair returns should be accompanied by a complete description regarding the nature of the defect. All return shipments must be properly packed in protective containers with identification of the sender and return authorization number on the carton.

A repair charge will be assessed on units returned for repair after expiration of the warrant period. A service and handling charge will be assessed on units returned to Dees and found not to be defective.

Repaired units are warranted for 90 days or the remaining period of the original warranty, whichever is greater.

In all instances, Dees retains the option of updating returned products to current technological standards in component or circuitry, conditioned on no change of features, functions or compatibility with approved units.

## Regulatory Notes

### FCC Requirements

1. The Federal Communications Commission (FCC) has established Rules which permit this device to be directly connected to the telephone network, Standardized jacks are used for these connections. This equipment should not be used on party lines or coin lines.
2. If this device is malfunctioning, it may also be causing harm to the telephone network; this device should be disconnected until the source of the problem can be determined and until repair has been made. If this is not done, the telephone company may temporarily disconnect service.
3. The telephone company may make changes in its technical operations and procedures; if such changes affect the compatibility or use of this device, the telephone company is required to give adequate notice of the changes. You will be advised of your right to file a complaint with the FCC.
4. If the telephone company requests information on what equipment is connected to their lines, inform them of:
  - a. The telephone number this unit is connected to
  - b. The ringer equivalence number
  - c. The USOC jack required
  - d. The FCC registration number

Items 'b' and 'd' are indicated on the label.

### Service Requirements

In the event of equipment malfunction, all repairs should be performed by our Company or an authorized agent. It is the responsibility of users requiring service to report the need for service to our Company or to one of our authorized agents. Service can be obtained at:

**4130 148th Avenue NE  
Redmond, WA 98052  
USA**

### Warning

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### Note

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

## **Equipment Attachment Limitations**

### **Notice**

The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

### **Caution**

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

### **Note**

- a. Never install telephone wiring during a lightning storm.
- b. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- c. Never touch uninsulated telephone wires or terminals unless telephone line has been disconnected at the network interface.
- d. Use caution when installing or modifying telephone lines.



**Dees** C O M M U N I C A T I O N S

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[www.dees.com](http://www.dees.com)

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