

CommandSTAR Lite

Product Planner

June 30th 2003

R4-8-2000B

Revision History

Version	Date	Author	Comments/Changes
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Introduction

CommandSTAR Lite is intended to be the heart of all communications in a small to medium-sized conventional radio system. A CommandSTAR Lite console is defined as an operator position, including the user interface and electronics, where mobile radio communications activities are controlled.

The function of a CommandSTAR Lite console is to centralize the communications of multiple base stations, repeaters and dispatch field units, and to integrate two-way radio communication with other dispatch requirements. These requirements may include, handling 911 calls, initiating paging, encoding and decoding Stat-Alert signaling, or controlling external functions with relay closures. CommandSTAR Lite seamlessly integrates radio, telephone, paging, and other communication resources for convenient dispatch use.

CommandSTAR Lite operator positions interface directly with analog radio channels and telephone lines and eliminate the need for traditional backroom switching equipment such as a Central Electronics Bank (CEB). The CommandSTAR Lite is available in two configurations, desktop and rack-mount. The configurations are identical except for the physical layout.

Every CommandSTAR Lite system is supplied with System Database Manager software which allows full system programming, maintenance, reconfiguration and customization to be performed in the field.

This CommandSTAR Lite System Planner is intended to familiarize you with the product and its functionality, as well as assist you in the ordering process and system design.

This planner is divided into the following sections:

- System Architecture
- Operator Position
- Console Features
- CommandSTAR Lite System Database Manager (CSDM Lite)
- Functional Product Specifications

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System Architecture

This section provides an overview of CommandSTAR Lite's equipment and interfaces.

CommandSTAR Lite Equipment

An advantage of the CommandSTAR Lite console is that the physical layout of the console is flexible. At installation, each console is configured according to the original order. However, from the CommandSTAR Lite System Database Manager position, consoles can be reconfigured at any time.

Every CommandSTAR Lite console ships with the following configuration:

- one (1) 115/230 volt AC power supply
- one (1) Keypad module
- one (1) Auxiliary Control Module (ACM)
- two (2) speakers (Select and Unselect)
- one (1) audio input for call director or E9-1-1 phone
- one (1) recorder port
- interface for gooseneck mic, desk mic, foot-switch and two headsets

Each console may also include optional boards:

- two (2) line telephone interface with Caller ID capability
- I/O module(s) for six (6) relay outputs and twelve (12) inputs
- 4 channel expansion
- Dual Channel Control Module(s)
- Digital Radio Control Modules(s)
- additional Auxiliary Control Module(s)

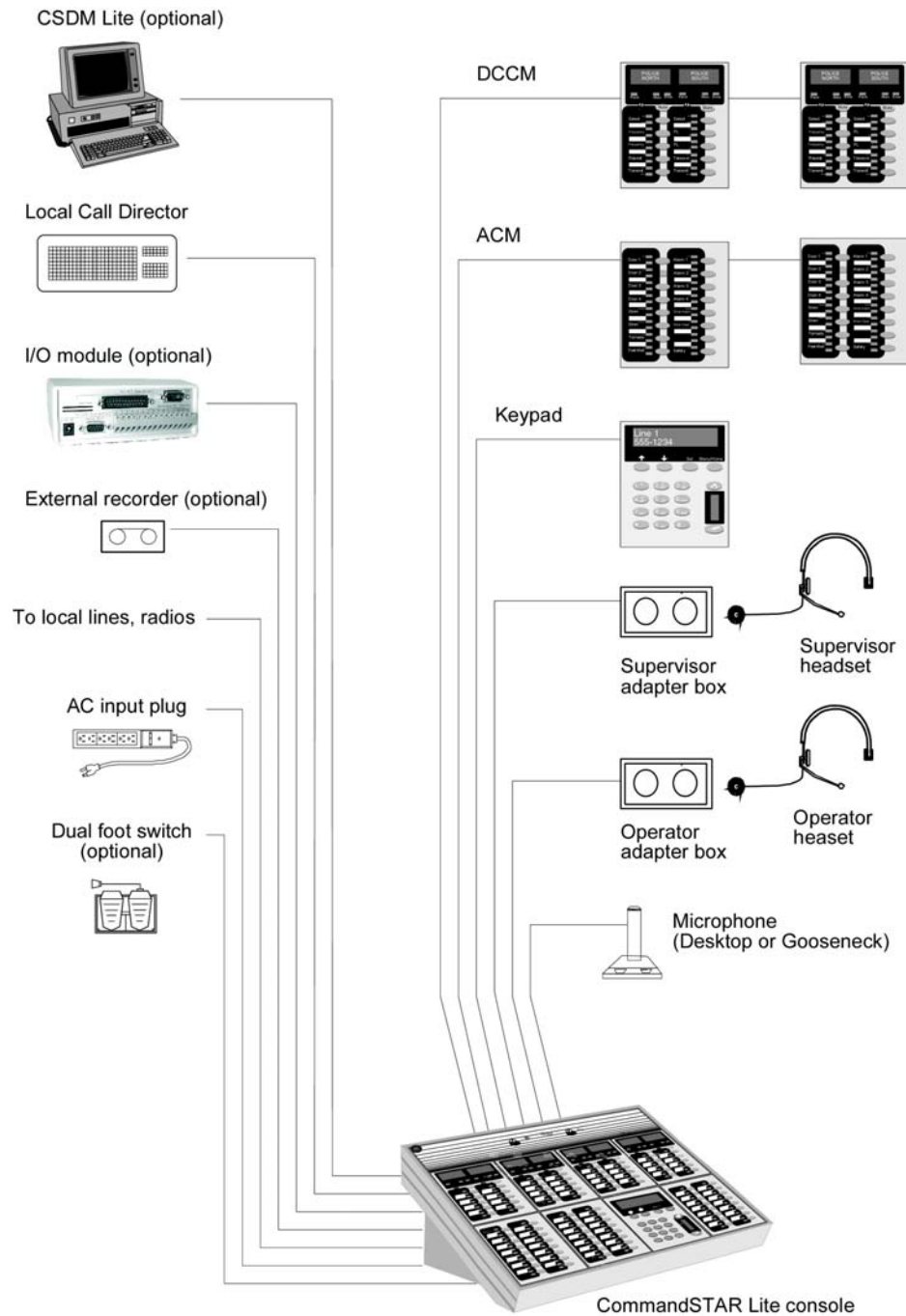


Figure 1
CommandSTAR Lite's peripheral equipment and interfaces.

CommandSTAR Lite Interfaces

CommandSTAR Lite can interface with:

- radio channels
- telephone lines
- CommandSTAR Lite Database Manager
- external recorder
- I/O module
- call director

Through an RS-232 port on the console, CommandSTAR Lite can also interface with a printer or an external clock.

Radio Channels

The CommandSTAR Lite console uses digital analog-to-digital and digital-to-analog voice switching technology to interface with analog radio. CommandSTAR operators can directly control conventional base stations or repeaters using E&M, tone or DC keying.

Telephone Lines

If equipped with a telephone interface module, a CommandSTAR Lite position can interface directly with analog telephone lines using analog-to-digital and digital-to-analog voice switching technology.

CommandSTAR Lite Database Manager (CSDM Lite)

The CommandSTAR Lite Database Manager is a computer running the CSDM Lite software package. CSDM Lite is used to configure system features, perform system maintenance and run diagnostics. Each CommandSTAR Lite position can connect to the CSDM Lite position via its RS-232 port. The connection can be either local or remote.

External Recorder Interface

The CommandSTAR Lite console supports a balanced 600 Ohms output for sending audio to recording devices such as a digital recorder. Signals that are recorded include the Select audio and the microphone,

Each radio channel is also equipped with a recorder port for recording the audio of the channel. The recorder port includes a 2175 Hz tone filter.

Audio recorders are useful for:

- instant call recording; in such cases the operator can playback a call that was hard to hear or difficult to decipher
- logging recording; in such cases calls are recorded and time-stamped and are used for reviewing procedures

A relay is provided for recorder activation if the recorder does not have VOX detection.

I/O Module

An I/O module provides the means to remotely operate relay contacts and sense/read opto-coupled inputs via a serial link.

The I/O module (field kit CDN6179) provides up to 12 opto-isolated inputs with ground detection and up to (6) form-C relay outputs.

Control buttons for I/O relay functions are located on the Auxiliary Control Module(s).

I/O module inputs can also be used for customer installed alarms or relay outputs. For example, they can be set up for the remote operation of doors, alarms, security cameras, main/standby operation, or for voter control.

Up to four I/O modules can be connected to the same console. As shown in Figure 3, when more than one I/O module is connected to the same console, an additional cable (CDN1304) is used to daisy-chain link the other modules together.

When ordering more than one I/O module for the same operator position, order option Z114 and up to 3 CDN6179 with the CDN1304 linking cable.

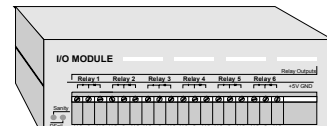


Figure 2
I/O module.

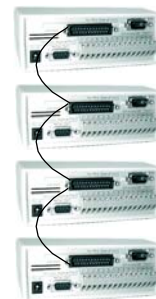


Figure 3
Four I/O modules
daisy-chained together.

Input/Output Module

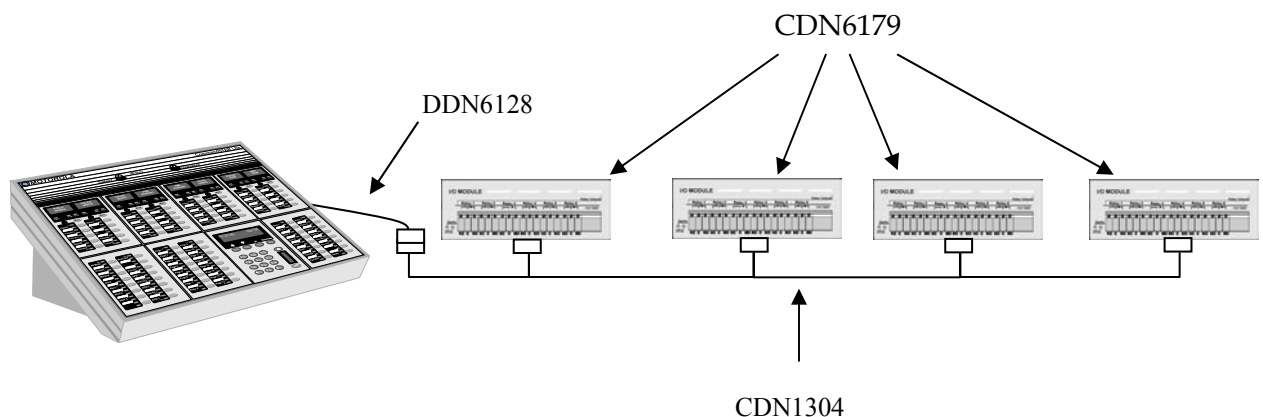
An I/O Module provides the means to remotely operate relay contacts and sense/read opto-coupled inputs via a serial link. Its applications allow remote operation of doors, alarms, Main/Standby operation and visual indicators from the Operator Position. Connection to the relays and opto-couplers is via terminal blocks on the module. The opto-coupler inputs are pulled down to -12V and are therefore not suitable for direct connection with devices using open collector outputs. The relays are rated as follows:

3W
150mA
60VDC

The terminal blocks have screw-clamp contacts that provide easy and quick means for secure electrical and mechanical connections to the I/O contacts and to both +5V and ground. Connection to the CommandSTAR Lite is via the RS-422 connector on the back panel. This connector also provides +5V power to the I/O module.

The CommandSTAR Lite has a single connector for I/O modules and can support four I/O modules. If more than one I/O module is to be connected to the port then a link cable is required to connect subsequent modules. This link cable has four connectors, one for each I/O module that can be connected to the CommandSTAR Lite and connects directly to the cable that is provided with the initial I/O module. Figure 8 below shows the connection of I/O modules to the CommandSTAR Lite.

I/O modules can be located remotely from the CommandSTAR Lite if required. In order to achieve this a custom cable is required (see Installation Manual, for details) and an external PSU should be used to provide power to the I/O module. Multiple I/O modules on a CommandSTAR Lite port is not supported for remote operation.



Note:
Z114AB1
includes
CDN6179 and one
DDN6128

Call Director

CommandSTAR Lite provides a single 4-wire audio line and two opto-isolated inputs to interface with standard call director equipment. The audio port can either be a 600 Ohms or a carbon headset interface.

Two types of call director interfaces are available:

- **Basic** call director enables the operator to use the CommandSTAR Lite console headset, or the console speaker and microphone, to communicate with calls from the call director interface.
- **Enhanced** call director provides all of the basic call director functions, and also enables an operator to create a patch that includes the call director interface as well as telephone lines and/or radio channels.

A single E9-1-1 phone can be plugged directly into the standard call director interface. If multiple E9-1-1 phone lines are needed, they would interface to CommandSTAR Lite through a call director.

RS-232 Port

Each CommandSTAR Lite console has one RS-232 port. The RS-232 port can support a connection to one of the following three features:

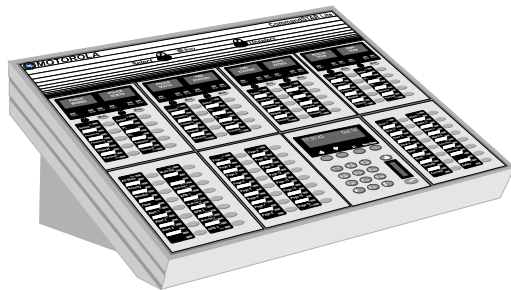
- printer used to log dispatch calls, Stat-Alert and telephone activities
- CommandSTAR Lite System Database Manager (CSDM Lite) position
- external clock such as the Spectracom NETCLOCK/2™

Operator Position

This section describes the CommandSTAR Lite operator position in terms of the user interface, including control modules, speakers and audio accessories. Specific features that are controlled from the user interface are covered in the following section.

Console Style

The CommandSTAR Lite is a dispatch console is available either as a desktop unit or a 19" rack-mount unit, compatible with standard bay furniture. The unit supports a maximum of eight (8) operator control modules and includes a Select and Unselect Speaker. The desktop unit measures 18 inches wide, 13 inches deep, and 7 inches tall. The rack-mount unit requires three 5.25" panels.



Desktop console



Rack-mount unit

Label Printing Program

The Label Printing program is shipped standard with each console. It allows you to produce and print labels for the operator control buttons on the CommandSTAR Lite console.

Operator Control Modules

The front panel layout of each CommandSTAR Lite is custom-designed based on system requirements. The base-model includes a Keypad module and one Auxiliary Control Module (ACM). The remaining six module positions can be filled with Control modules, as required, from the list below

Channel Control Module (CCM) – support two RF resources

Single Display Channel Control Module (SDCCM) – supports a single RF resource providing a display for channel/frequency aliases and signaling decode.

Display Channel Control Module (DCCM) – supports two RF resources providing a display for channel/frequency aliases and signaling decode.

Digital Radio Control Module (DRCM) – supports a single control station via SB9600 bus and provides a display.

Auxiliary Control Module (ACM) – supports 16 button controls, each with 2 indicators.

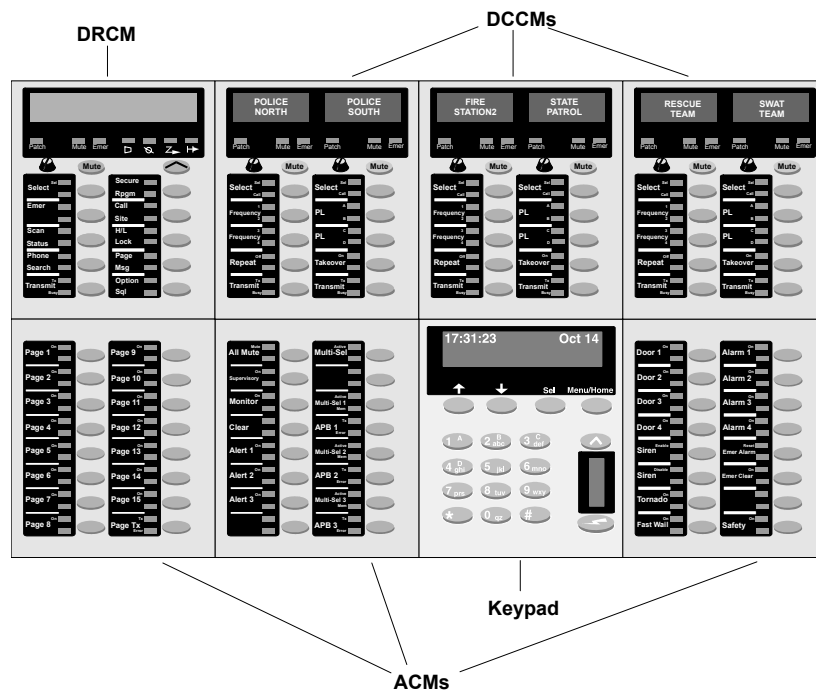


Figure 4 Example of a CommandSTAR Lite configuration.

Keypad Module

The Keypad module is part of the standard CommandSTAR Lite configuration. This module features an alpha-numeric keypad and is used for dialing a telephone number, entering a paging code, and setting the time display in either 12- or 24-hour clock format. The Keypad display shows the date and time, the volume intensity level (VU) of the selected channel and microphone audio, as well as line information.

The Keypad module also includes a common push-to-talk (PTT) key. Other function buttons on the Keypad are: Scroll up, Scroll down, Select (Sel), Menu/Home and Shift (↵). The buttons are used when running the built-in system tests or reprogramming console features.

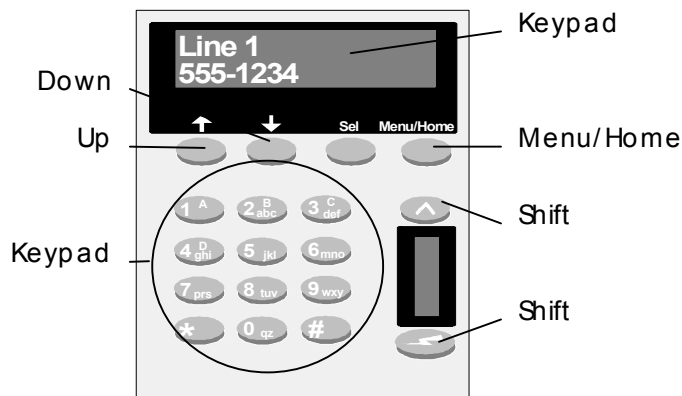


Figure 5
The Keypad module.

Some Keypad buttons also function as extensions of the Digital Radio Control Module (DRCM). When a DRCM is selected, these dual-purpose buttons emulate buttons on the digital radio controlled by the DRCM.

Keypad module features are summarized in the following table:

Features / Buttons	Description
Display area	Displays information and digits.
Up (↑)	Used in console tests and programming mode to perform a selection.
Down (↓)	Used in console tests and programming mode to perform a selection.
Keypad	Used to enter telephone numbers and page codes, and access specific tests and programs.

Select	Enables console tests and configuration operations.
Menu/Home	Validates the digits entered on keypad and confirms programming entries.
Shift	Used to combination with the Select button to access the tests and programming mode. Also used in conjunction with the buttons 1 to 4 on the Keypad to enter letters A, B, C and D for paging purposes.
PTT	Push-to-talk button is used for radio transmission.

Auxiliary Control Module (ACM)

Each ACM has sixteen (16) control buttons. Each control button is assigned to a general dispatch function and has one or two status indicators (LEDs). A feature is enabled or disabled by either pressing or releasing the button.

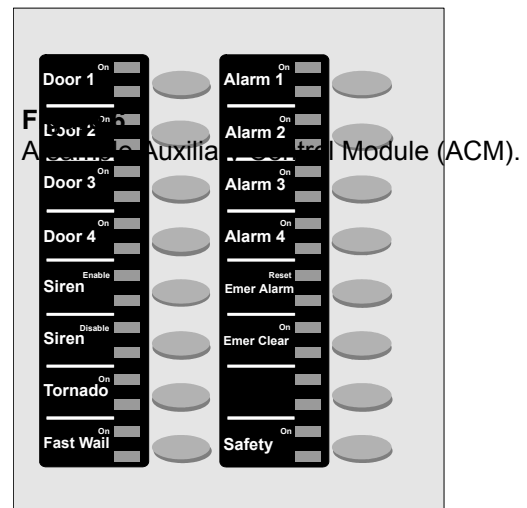
The layout of each ACM is customized based on the functions required at the operator position. Function buttons are gray or red. Red buttons designate a transmit function.

All common dispatch control features, such as monitor, all mute, patch, multi-select, and page, are accessed from programmable function buttons on an ACM. Each button is programmed and custom-labeled in the field using the CommandSTAR Lite System Database Manager (CSDM) software.

One ACM is shipped standard with each CommandSTAR Lite console. The number of ACMs required at each console is dependent upon the features required by the customer. Features that can be activated via software programming from a CSDM position are not accessible if the ACM function control button is not available.

Additional ACM(s) can be added at the factory by ordering option Z104, or in the field with kit DDN6132.

The ACM's control functions are described in the section *Console Features*.

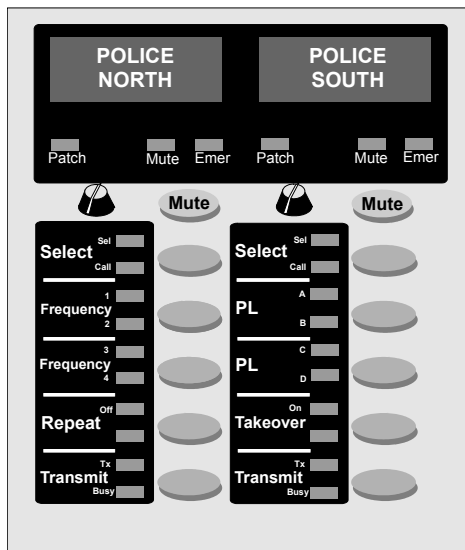


Dual Channel Control Module (DCCM)

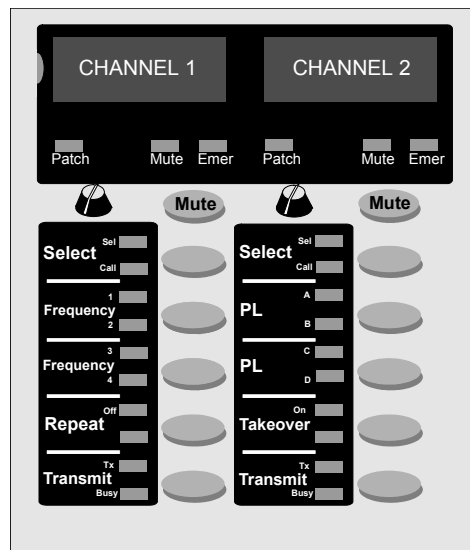
CommandSTAR Lite's standard configuration does not include an operator interface to radio stations or repeaters. In order to control a radio channel, DCCM(s) need to be added.

The DCCM is available in two versions:

DCCM with Programmable Displays (Option Z102)



DCCM without Programmable Displays (option Z102)



The DCCM with programmable displays (field kit DDN6131) decodes signaling data per channel. The channel name is programmable on the DCCM and appears in a 2 line by 8-character alpha-numeric display area.

For radio channels that do not require a display for decoding signaling data, CommandSTAR Lite can be configured with the DCCM without programmable displays (field kit DDN6130). When this type of DCCM is used, channel names are exhibited on the module with fixed, slide-in labels. Like ACM function labels, these labels can be printed in the field to customize channel names.

The following standard controls and visual indicators are supported on a DCCM:

Control Buttons	Visual indicators (LEDs)
Select	Select
	Call
	Patch
	Emer
Mute	Mute
Transmit	Transmit
	Busy
Option 1	2 indicators
Option 2	2 indicators
Option 3	2 indicators
Volume	

Optional controls (1 through 3) are used for different radio channel features such as multi-frequency, multi PL, repeat disable, remote takeover and more. Three control buttons and six LEDs are available per channel for radio-specific optional functions.

For more information on optional DCCM controls, refer to section *Radio Channel Control* on page 31.

Digital Radio Control Module (DRCM)

The DRCM emulates the buttons and indicators for three digital radio types:

- Digital Spectra Astro (Model W9)
- MCS-2000 (Model III)
- CDM1550 (LS, LS+)

Using a DRCM, an operator can control a digital radio from their CommandSTAR Lite console.

All DRCMs are shipped with the Mute, Select and Transmit controls. All other function buttons emulate those on the specific model of digital radio controlled by the DRCM.

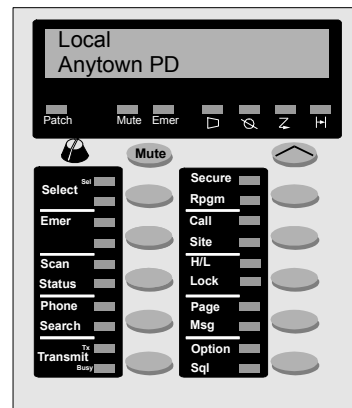


Figure 7
A sample Digital Radio Control Module (DRCM).

The DRCM contains a single two-row display:

- For the Digital Spectra Astro radio, the top row of the DRCM display shows the information that appears on the radio display, and the bottom row indicates whether the radio has received a priority mode.
- For the MCS-2000 radios, the two rows on the DRCM display correspond to the two rows on the radio displays.

DRCM(s) can be added at the factory by ordering option Z00170, or in the field with kit DDN6138.

Audio Accessories

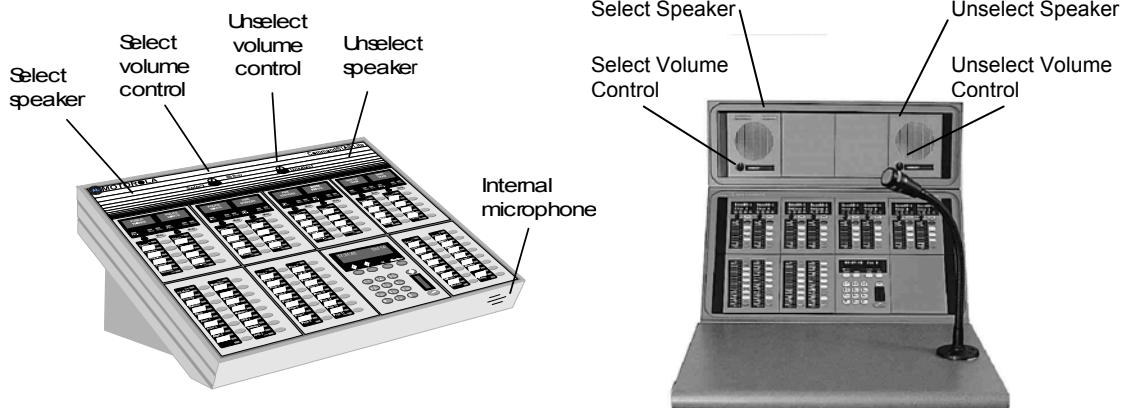
Audio equipment for the CommandSTAR Lite console can include any of the following:

- speakers
- an internal condenser microphone
- one gooseneck or desktop microphone (optional)
- one jackbox for the operator headset and one for the supervisor headset (both optional)
- one operator headset (optional)
- one supervisor headset (optional)
- one dual push-to-talk (PTT) foot-switch (optional)

Speakers

The CommandSTAR Lite console includes two built-in speakers. These speakers are known as Select and Unselect speakers.

Select is dedicated to receive audio from the selected channel. Audio from all other channels is heard at the Unselect speaker.



CommandSTAR Lite's built-in speakers and volume controls.

Microphones

As shown above, the deskset version of the CommandSTAR Lite console ships with an internal condenser microphone – the rack mount version does not. The console also has two connector plugs for external microphones. One accommodates a gooseneck microphone (field kit TDN9941) and the other a desktop microphone (field kit HMN3000). The console can only be programmed to accept one of these external microphones at a time.

The flexible gooseneck provides high-impedance cardioid (unidirectional) pattern microphone. It is considered a “close-talking” microphone in the sense that a user needs to speak within a few inches of the microphone. The optional gooseneck microphone can be mounted directly to either side of the unit.

Headset Jackbox

A headset jackbox (DDN6516) can be ordered for both the operator and supervisor headsets. These boxes accommodate standard dual jack 6-wire headsets. The CommandSTAR Lite console has two jackbox connector ports to allow for parallel operation by a supervisor and an operator.

Headsets

The headset is used to reproduce incoming Select audio when the headset is connected to the jackbox. CommandSTAR Lite consoles can interface with most standard dynamic or carbon compatible headset microphones.

A variety of 6-wire headsets are offered to fulfill a range of user preferences. For more information on available options refer to the price pages.

Foot-switch

Each console can support one dual foot-switch (BLN6732) to provide hands free push-to-talk (PTT) radio operation. The dual foot-switch is an option for systems equipped with CTCSS channel monitoring; the right switch is used for PTT while the left is used for CTCSS channel monitoring.

Console Features

This section describes the features and dispatch functionality of CommandSTAR Lite. Most features exist in the firmware of the product and are field programmable with CommandSTAR Lite's System Database Manager software. However, to access these features, the appropriate control module may need to be ordered.

Console Controls

The following console control features are standard with every CommandSTAR Lite console and do not require additional hardware.

Operator Busy

The Operator Busy light shows whether the Select speaker at the specified operator position is engaged with transmit or receive audio. There is one Operator Busy (LED) per console located between the built-in speakers.

Push-to-talk (PTT)

There is one Common PTT (push-to-talk) button per CommandSTAR Lite console. The PTT button is located on the Keypad module. The operator has the choice of using this button, or any other push-to-talk option such as the foot-switch, the microphone, or the Instant TX button(s) on the DCCM(s).



Figure 14
Common PTT control
on Keypad module.

Time and Date

CommandSTAR Lite displays the time in 12- or 24-hour format on the Keypad display. The date and time are programmable through CSDM Lite or at the console. Also, if needed, the time can be synchronized to an external clock. Daylight Savings is automatic when a computer running the CSDM Lite software is connected to the console.

Integrated Paging Encoder

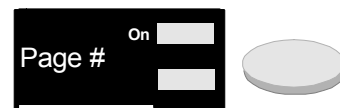
CommandSTAR provides an integrated paging encoder that supports industry-standard formats:

- 2-tone
- 2 + 2 (Quick Call)
- 1 + 1 (QC II)
- DTMF
- 5/6 Tone
- GE99
- NEC5
- NEC6
- Reach 1 + 1
- Digital Dial

Page codes are sent via Manual Dial, Alias Page or by a one button paging method. All methods require function buttons to be programmed and labeled on the ACM.

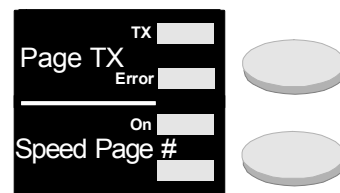
Manual Dial

For Manual Dial, the operator presses Page #, dials the page code from the Keypad, and then presses Page Tx to start the transmission. Each Page # button is pre-programmed with a paging format (DTMF, 2 tone, etc.).



One Button Paging

One button paging is a quick method to page previously defined destinations. Each Speed Page button is pre-programmed with format, code, channel and frequency. Pressing Speed Page automatically dials the destination. Page Tx is then pressed to start the transmission to that destination.



Multiple Speed Page buttons can be pressed, and stacked, prior to activating the transmission with Page Tx. Each page in the group is sent sequentially to its destination, as previously defined.

Alias Page

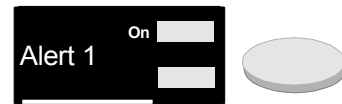
Paging destinations can be pre-programmed and defined using descriptive names, or aliases. Up to 512 aliases can be stored in memory.



Alias Page is used to pull up the list of these aliases on the Keypad module display. The operator scrolls through the list, selects an entry and presses Page Tx. Alias Page is a quick paging method that uses minimal buttons.

Alert Tones

An alert function transmits a special pre-programmed signal over the selected radio channels. This function allows the operator to inform the receiving end of an urgent radio transmission to follow.



Three tone frequencies are possible:

- Tone 1—1,000 Hz tone
- Tone 2—800 and 1,500 Hz tones
- Tone 3—a pulsing 1,500 Hz tone

Stat-Alert Signaling

CommandSTAR Lite supports Motorola MDC1200's Stat-Alert data signaling format. Stat-Alert functions operate on a per channel basis and are described in the following sections in terms of incoming and outgoing signaling features.

Incoming Signaling

A DCCM (option Z102) is required to display Stat-Alert data. Fives types of incoming Stat-Alert signaling are possible:

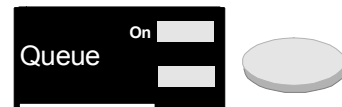
- PTT ID
- Status Message
- Call Alert
- Voice Alert
- Emergency

PTT ID

CommandSTAR Lite decodes and displays per channel the PTT ID (and message, if applicable) associated with the incoming signaling. A PTT ID is sent by units whenever voice transmission begins.

When a PTT ID is received at the console, CommandSTAR Lite attempts to replace the numerical ID with a name by looking through its alias database for the channel on which the ID was received. If an alias exists, the alias is displayed; otherwise, the-4 digit ID is shown on the per channel display. The display returns to channel ID mode when the call terminates.

Up to 15 PTT IDs per channel can be stored and recalled with the Queue button. When pressed, the Queue feature shows the 15 most recent IDs for the selected channel on the Keypad display. Scroll is used to move through the list.



Status Message

A Status Message is received when a subscriber activates a preset switch, or when a dispatcher manually requests the status. With the exception that the display alternates between the originator ID and the received status, a Status Message is handled in the same way as a PTT ID message.

Call Alert

A Call Alert is received when a subscriber specifically pages a console. At that console, a momentary tone will sound and the display will alternate between Call Alert and the originator ID. The Call Alert will be cleared when the dispatcher transmits on the channel.

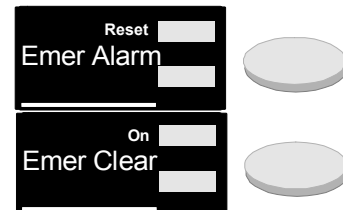
Voice Alert

A Voice Alert is received when a subscriber specifically pages a console. At that console, a momentary tone will sound and the display will alternate between Voice Alert and the originator ID. The display returns to Caller ID when the call terminates.

Emergency

An emergency is received when a subscriber activates the Emergency switch at their console. When this is done, a tone is heard at the other consoles, the Emergency LED flashes, and the display alternates between Emergency and the originator ID.

Each operator can mute the tone by pressing the Emer Alarm button. This also turns the Emergency LED ON and stops the display from alternating. An emergency can be cleared from all positions or by one customer-designated position with the Emergency Clear button. The Emer Alarm and Emer Clear buttons are used to clear and unqueue incoming radio emergencies from a mobile or portable radio.



Outgoing Signaling

The following outgoing Stat-Alert signaling features are accessed through page formats:

- Radio Check
- Call Alert
- Voice Alert
- Radio disable
- Radio enable
- Remote Monitor
- Status Request

All outgoing Stat-Alert features except Voice Alert and Call Alert require an Acknowledge (ACK). When a Stat-Alert feature is transmitted, the system waits for an ACK. If no ACK is received, the system retries up to four (4) times and the display indicates *No Acknowledge*. The channel is open for voice only after the ACK is received.

With the exception of the Acknowledge function, outgoing Stat-Alert signaling features operate identically to paging.

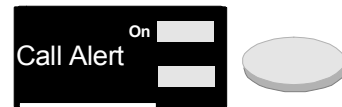
Radio Check

Radio check allows the operator to verify whether a unit is operational and in range, regardless of whether someone is able or willing to answer a voice call.



Call Alert

Call Alert sends a visual and audible call indication to the called party. At that console, a momentary tone sounds and the display alternates between Call Alert and the originator ID. A Call Alert is cleared when the operator transmits on the channel.



Voice Alert

Voice Alert sends an audible call indication to a subscriber unit and unsquelches (opens) the speakers.



Radio Disable

Radio Disable allows an operator to remotely render a radio inoperable providing that it is on and in range. This feature is most useful when a radio is lost or stolen.



Radio Enable

Radio Enable allows an operator to remotely enable a radio that was made inoperable. To use this feature, the radio must be on and in range.



Remote Monitor

With Remote Monitor, an operator can activate the PTT of a remote radio unit to hear field communications. This feature is useful for surveillance or in a "man down" situation.



Status Request

This function allows the operator to find out the status of a vehicle.



DTMF Decoding

CommandSTAR Lite decodes dual-tone multi-frequency (DTMF) tones on a per channel basis. This feature allows a console to receive on a per channel basis ANI (Automatic Number Identification) from field radios. CommandSTAR Lite can be pre-programmed to convert ANI to an alias. A DCCM (option Z102) is required to display ANI.

Also supported on a per channel basis is DTMF selective call, which enables the field radio to activate the console's speaker audio.

Muting

CommandSTAR Lite supports the following muting features:

- All Mute
- Cross Mute

CommandSTAR Lite also supports mute for radio channels. This feature is described in the section *Radio Channel Control* on page 31.

All Mute

This feature mutes all unselected audio. The unselect audio is automatically restored to its previous level after a preset time or when All Mute is pressed again. The default time is 30 seconds.



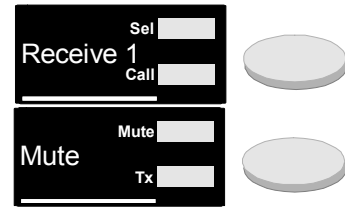
Cross Mute

CommandSTAR Lite supports programmable cross muting for radio channels. This feature automatically mutes the receive audio on the desired channels when a cross-muted channel is keyed. By muting the audio at the keying position at the cross-muted positions, cross-station interference is prevented. To activate this feature, cross muting tables must be pre-programmed for each console using the CommandSTAR Lite System Database Manager.

Channel Control through an ACM

If needed, radio channels can be controlled from an ACM rather than a DCCM. This option frees up a module slot and is suited to settings where operators interact infrequently. Channel control is performed through the Receive and Mute button on the ACM.

The Receive # button acts as the Select for the channel and can be relabeled with the channel name. A companion Mute button is always provided. Given that there is no Instant Transmit button, the main PTT button is used. Channel volume can be adjusted through the Keypad module.



Patching

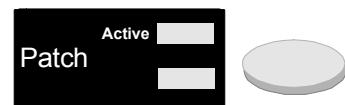
In a patch, an operator sets up radio channels, telephone lines and enhanced call director circuits to communicate with one another. Once the patch is set up, the operator can continue with other responsibilities. Any quantity of channels available to the console can be patched together.

CommandSTAR Lite offers the following patching features:

- patch
- patch with memory
- patch instant transmit with memory
- patch voice-operated assistance

Patch

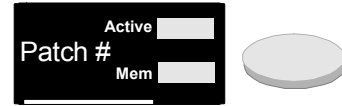
Parties are added or removed from a patch by holding the Patch button and either selecting the radio channel or accessing the telephone line or call director. The Patch control includes a status LED to show when the patch is active.



Patch (with Memory)

The Patch with Memory control includes a Memory status light to show when a patch is stored. Up to 10 patches can be stored, each with their own memory/recall button.

When the Patch with Memory button is pressed, that patch is set up again. Four of the possible 10 patches can operate simultaneously.



Patch Instant Transmit (with Memory)

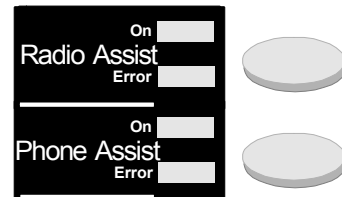
The Patch Instant Transmit control includes a status light (TX) to show when the operator is transmitting over the patch.



Patch Voice-Operated Assistance

CommandSTAR Lite can provide two types of patch voice-operated (VOX) assistance to allow the operator to manually override voice or radio detection during the patch:

- Radio Assist; transfers audio from the radio channels to other patch participants
- Phone Assist; transfer audio from the telephone lines to the other participants



Pressing the button on the control activates the feature. Releasing the button cancels the assist. The Error status light appears when the operator presses the button, but a patch is not selected. These features are disabled for a full-duplex patch.

Multiple Select

In addition to offering a standard multiple select feature, CommandSTAR Lite also offers multiple select with memory and instant transmit.

Multi-Select

The Multi-Sel control allows an operator to select multiple radio channels for simultaneous transmission. Channels are added or deleted by pressing the Multi-Sel button and then pressing Select for those channels.



To transmit to the entire Multi-Select set, the operator simply uses the common PTT button. To transmit to only one radio channel in the set, the operator uses the Instant Transmit button for that channel.

Multi-Select with Memory & Instant Transmit (APB)

Up to ten (10) Multi-Select channel combinations can be stored in memory and instantly transmitted via an APB (All Points Bulletin) control. Each pre-programmed Multi-Sel # button requires a corresponding APB # number. Space must be made available on the ACM(s) for the quantity desired per operator position.



16 Frequency

The Frequency button on the ACM is used to display the available frequencies for the channel selected. A pre-programmed list of up to 16 frequencies per tone control station will appear on the Keypad module display. The user changes the frequency of the select channel by scrolling through and selecting from the list, or by keying in the frequency number on the Keypad.



Note: Frequencies can also be selected via controls on a DCCM. For more information, refer to *Multi-Frequency Operation* on page 33.

Telephone Operation

CommandSTAR Lite offers the following telephone operation features:

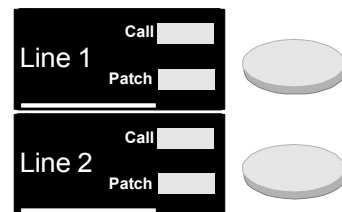
- Line Access
- Flash
- Hold
- Ring Mute
- Phone Transmit

The controls used to activate these features are all located on the ACM. CommandSTAR Lite also displays Caller ID on the Keypad module if the customer subscribes to their telephone company's Caller ID service.

Line Access

An operator can gain access to a telephone line for an outbound call by a dial-up or direct method. CommandSTAR Lite provides access to up to two (2) telephone lines.

For direct access to telephone lines, ACM buttons can be pre-programmed for the available telephone lines. The buttons would be designated as Line 1 or Line 2 and re-labeled as appropriate.



The Line # buttons also serve to alert the operator of which line an inbound call is on by illuminating the Call LED. The operator can then answer the call by pressing this button.

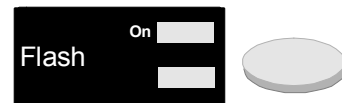
To link an active phone line with a radio channel or group, the user would select Patch and then depress the select button of the appropriate radio channel(s) and the Line # button for the phone line.

A Release button is needed to “hang up” a phone line.



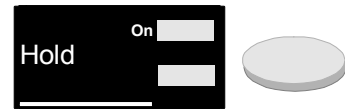
Flash

This feature allows a dispatcher to perform a hook flash on a CO line.



Hold

The Hold button allows an operator to put the active call or intercom on hold for the purpose of placing or answering another call.



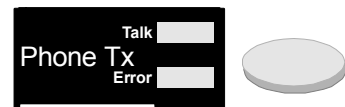
Ring Mute

The Ring button silences the ringing of inbound calls.



Phone Transmit

If a headset is in use, a telephone call is full duplex and no buttons need to be pressed to talk to the caller. If a headset is not used, the call is half-duplex and the console operator requires a Phone Tx button. This button acts like a PTT button for the telephone. When Phone Tx is pressed, receive audio is disconnected from the speaker to prevent feedback.



If a radio channel is selected while a telephone call is in progress, audio from both sources will be mixed on the Select Speaker or headset. To concentrate on the telephone audio, the user must de-select the radio channel.

Caller ID

The Keypad module displays the caller's name or number if this customer subscribes to a Caller ID service from their telephone company. If the Caller ID service provides both name and number, the Keypad displays only the caller's name.

The telephone line identification (Line 1 or 2) is displayed on the first status line of the Keypad display, while the second line displays the caller's name or number.

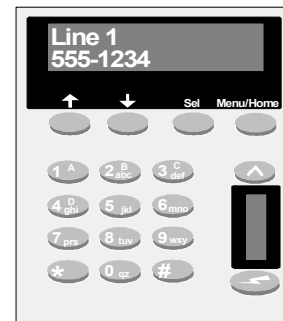
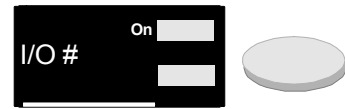


Figure 15
Caller ID on
Keypad display.

General Purpose Input/Output

General purpose input and output buttons, identified by the I/O # label, are used to control an external device (such as a security camera or a magnetized door) or to monitor a status input from an outside device.



To use I/O buttons, and I/O module (option Z114) must be ordered. The I/O module provides 12 opto-coupled inputs and 6 form-C relays. Up to four (4) I/O modules can be added to each operator position.

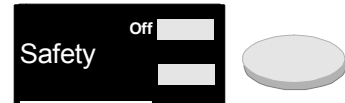
Each output relay uses a control button on the ACM or an optional control button on the DCCM.

Other general purpose input /output features supported by CommandSTAR Lite are:

- Safety
- Site Control
- Alarms

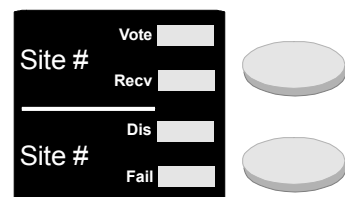
Safety

Each console can be equipped with a Safety Control that prevents unwanted activation of external equipment by requiring two controls to be activated in sequence.



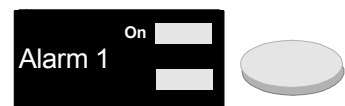
Voter Site Control

CommandSTAR Lite interfaces with voting receiver comparators such as “force vote” and “disable” outputs and “receiving”, “voted” and “failed” inputs for each voter channel. General purpose I/O's are required to interface with voting comparators.



Alarms

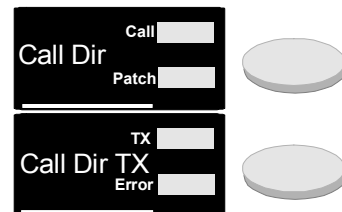
CommandSTAR Lite allows for up to 32 alarm tones per system to identify critical (customer-defined) problems. The use of an external alarm is defined at each site. A status indicator is provided for each alarm.



CommandSTAR Lite does not initiate the alarm. Pre-defined alarms are simply acknowledged at the console. General purpose I/O's (option Z114) are required to receive an Alarm.

Call Director Access

CommandSTAR Lite interfaces to call director equipment through a 4-wire audio line and two standard opto-isolated inputs. The Call Director interface provides a keyset for the operator and can be patched into telephone lines or radio channels.



Monitor

The operator can check if a radio channel is in use by simply pressing the Monitor button on an ACM or by pressing the left side of the dual foot-switch.

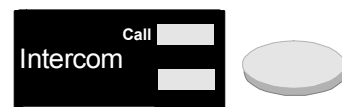


Intercom

CommandSTAR Lite offers both base station and digital intercom.

Base Station Intercom

The Intercom button lets the operator talk directly with personnel at selected base stations. To do so, the operator first selects the radio channel then presses the Intercom button.



Digital Intercom

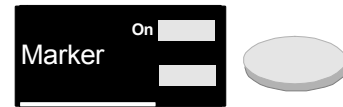
The Digital I'com button allows operators who are controlling a common digital radio (through a DRCM) to communicate with one another. An operator can communicate directly with another operator, or with all operators who have access to the digital radio.



Operators are identified by their Console ID number. This ID is programmed at the console through the CSDM Lite.

Priority Channel Marker

The Priority Channel Marker alerts radio operators of a radio channel's priority status and warns non-critical or unauthorized radio users not to transmit on that channel.



Radio Channel Control

The Dual Channel Control Module (DCCM) supports two radio channels. The following features are possible when a DCCM (Z100 or Z102) is ordered.

Mute

CommandSTAR Lite supports one Mute button per radio channel. For each radio channel, there is also a Mute status indicator (LED).

To mute the volume of a radio channel, the operator presses Mute on the DCCM. To return to regular volume, the operator presses Mute again.

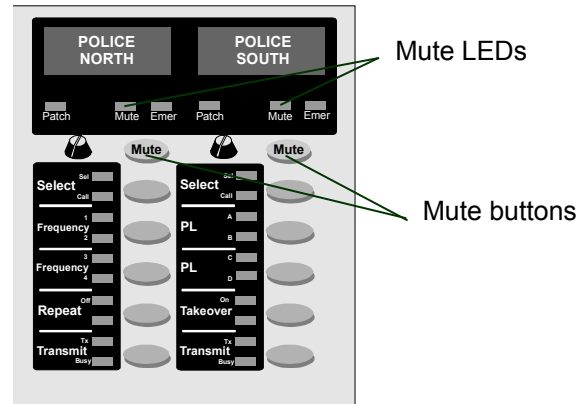


Figure 16
Dual Channel Control Module (DCCM).

Select

A Select button is provided standard per channel. Each Select button is equipped with two status lights. Pressing this button toggles between selecting and unselecting the radio channel.



Instant Transmit

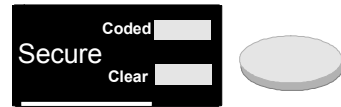
CommandSTAR Lite includes one Instant Transmit button per radio channel. Pressing this button gives immediate access to the radio channel if it is open, without altering the current selected channel status.



Coded/Clear

CommandSTAR Lite can receive or transmit externally encrypted voice signals on designated radio channels.

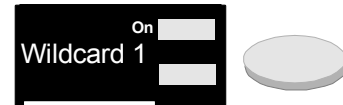
The Secure button allows an operator to specify whether a secure base station should be keyed with coded or non-coded audio.



Coded/Clear is possible via tone control direct to the station or, for added security, through a Console Interface Unit (CIU). One input and one output from an I/O module can be used between the CIU and the console to alert dispatch to the status (coded or clear) of incoming subscriber messages.

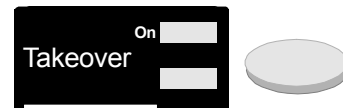
Wildcard Selection

The DCCM can be equipped with two (2) Wildcard controls. These controls allow the dispatcher to activate and de-activate various radio ancillary equipment.



RCU Takeover

An external remote control unit (RCU) can be connected to each radio channel. Pressing the Takeover button, the RCU interface state toggles between enabled and disabled. A relay is used to disconnect the transmit wire pair of the remote control unit from a base station in the disabled state. The RCU's audio must be routed through the CommandSTAR Lite console for this feature to work.



Repeat

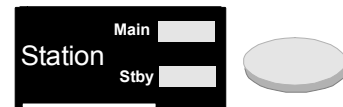
The Repeat option allows all receive audio from a specified radio channel to be processed at the CommandSTAR Lite and retransmitted, under operator control, back to the station. The Repeat button is used to disable repeat and cut off the repeated outbound radio.



Main/Standby Station

The Station button is programmable and allows the operator to select one of two base stations for operation. The Station button toggles the radio channel audio, through relays, between the main and the standby base station.

Main/Standby requires an I/O module (option Z114) for switching audio lines.



Multi-Frequency Operation

The Frequency button selects the transmit and receive frequencies for multi-frequency radio channels.

Each radio channel can have:

- separate transmit and receive
- coupled transmit and receive
- shared transmit and receive

Note: CommandSTAR Lite is capable of a maximum of 6 frequencies per tone control channel (station) when Frequency control are located on the DCCM(s).

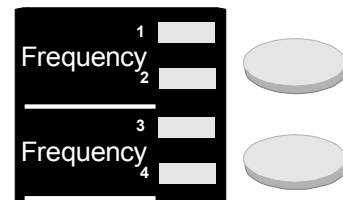
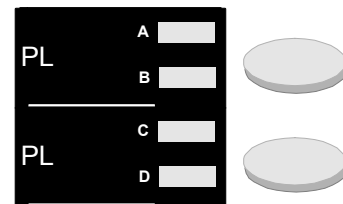


Figure 17
Frequency controls for a coupled four-frequency radio channel.

Private Line Operation

Private Line (PL) buttons are used to control multi private line stations. The buttons allow an operator to select up to six (6) private lines per tone control station. Each button toggles between 2 PL's.



CommandSTAR Lite System Database Manager (CSDM Lite)

This chapter describes the CommandSTAR Lite Database Manager that is shipped standard with every CommandSTAR Lite system. The CSDM Lite position consists of a software package and customer supplied hardware.

CSDM Lite Position

The CSDM Lite position is used for configuring system features and required at every customer site. The CSDM Lite position consists of a software package and a customer-supplied standard IBM PC 486 or higher.

The CSDM Lite software is used to configure CommandSTAR Lite system features. System maintenance and trouble-shooting is also performed from the CSDM Lite position.

Each CommandSTAR Lite system requires only one CSDM position for complete and reliable maintenance. To configure or run diagnostics on a CommandSTAR Lite console, the CSDM Lite position must be connected to it via an RS-232 link. In cases where the CSDM Lite position is further than 50 feet from the CommandSTAR Lite console, a remote connection can be set up using a modem.

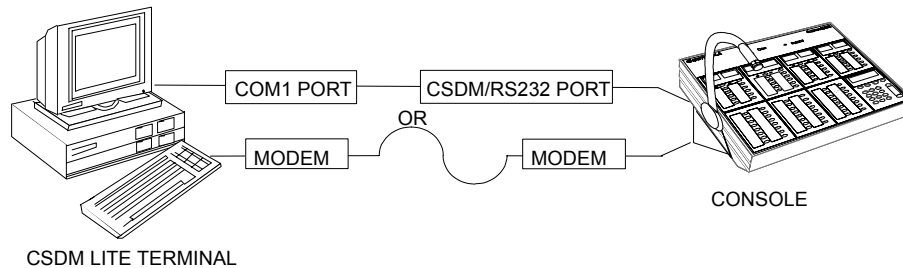


Figure 18
Connection between the CSDM Lite position and console.

CSDM Features

The CommandSTAR Lite System Database Manager is a powerful configuration and maintenance tool for the CommandSTAR Lite system.

CSDM Lite offers the following advantages:

- menu-driven user interface
- on-line help
- security
- convenience

Menu-driven User Interface

The CSDM Lite software uses an intuitive menu-driven interface. CSDM Lite's menus allow users to access the system configuration database, as well as perform software upgrades, general maintenance and diagnostic procedures.

Examples of CSDM screens for programming and editing the console functions are shown below.

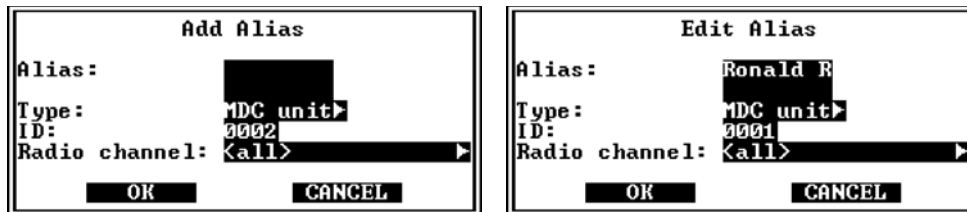


Figure 19
Programming screens for adding and editing a Paging Alias.

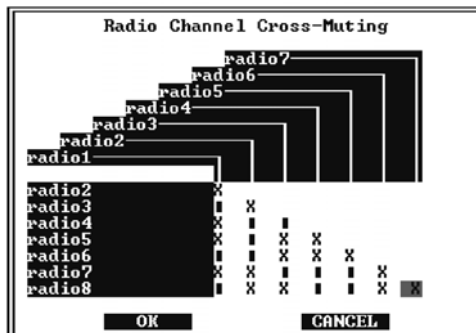


Figure 20
Cross-mute matrix set-up.

Edit Radio Channel

Name: radio5 Num. wires: 4W half duplex
Mode: RX-TX Location: [Port 5]
Repeater: None
PTT relay: v
Remote repeat disable: (N/A)
Repeat disable relay : (N/A)
Call detection method: Voice det
High speed mute: ☐
Voice encryption: ADD
Main/standby relay: ADD
First auxiliary I/O: None
Second auxiliary I/O: None
Parallel Status: Off
RX multi-frequency: 1
TX multi-frequency: 1
Signaling method: Tone
Remote control unit: Off
Caller ID format: None
DTMF Selective call: ☐
TX Voice Delay: Off 0 ms

Edit Radio Channel

Recorder level: -10 dBm TX level: 0 dBm
Muting level: Muted RX level: 0 dBm
Unselect speaker: Default RX detect threshold: -20 dB
Tone signaling plan: Default RX hangover delay: 2000 ms
DC signaling plan: (N/A)
PL Strip supported: ☐
Number of PL/DPL: 0
Wildcard frequencies: 0
STAT-ALERT settings: (N/A)
DTMF decode settings: (N/A)
Priority marker: 600
RX impedance: 600

Figure 21
Radio channel editing screens.

On-line Help

Extensive help is available on-line for all menu options.

Security

Access to CSDM Lite is password protected. For security reasons, not all menus are available to all users. CSDM Lite has three different levels of users:

- regular users who can view the system logs
- the supervisor who can view the system logs and run diagnostic tests
- the super-user who can view system logs, run diagnostic tests, upgrade software and add/modify user accounts

Convenience

Qualified personnel can use the CSDM position for local or remote maintenance by dialing into the CSDM through a modem.

CSDM Lite Applications

Using CSDM Lite, a user can perform these functions on a CommandSTAR Lite console:

- configure system features

Note: The modified system configuration file can be saved to a disk and uploaded to the system.

- run built-in tests for maintenance and reliability
- log system errors
- upgrade to a new release of the software

System Configuration

CSDM Lite allows an administrator to configure system parameters in order to meet specific operating requirements.

The following parameters are configurable:

- console layout and control assignments
- radio channels
- phone lines
- paging numbers and lists
- general purpose input/outputs

Testing and Diagnostics

A user designated as system supervisor can use the CSDM Lite software to run tests and diagnostics. Tests and diagnostics can be used for either regular maintenance or to aid in troubleshooting.

Software Upgrades

With CSDM Lite, it is quick and easy to upgrade a CommandSTAR Lite console to a new release of the software. CommandSTAR Lite's software is mature and well-tested, but can be enhanced and expanded with new features that become available in the future.

Hardware Configuration

The computer running the CSDM Lite software should meet the following hardware requirements:

- 80486 CPU @ 25 MHz, minimum
- DOS 5.0, minimum
- **Note:** CSDM Lite can run on Windows 95/98™ (using MD-DOS Prompt), but is not compatible with Windows NT™ or Windows 2000™.
- VGA or SVGA color monitor
- 4 Mb RAM, minimum
- 100 Mb hard drive, minimum
- 3.5" floppy drive
- printer port
- mouse
- keyboard
- one COM port reserved for communications with a CommandSTAR Lite console (with or without modem)
- one COM port reserved for remote maintenance (with modem)

Modems can be internal or external. They must be Hayes-compatible, with a minimum recommended speed of 9600 baud.

Ordering Requirements

All CommandSTAR Lite consoles ship with programming software (CSDM), which requires a PC operating DOS 6.x, or Windows 95/98 with an available serial port. A cable is not provided and needs to be ordered separately (CDN6181 or CDN6182).

The CommandSTAR Lite can be ordered as a desktop or rack mount unit in one of two base configurations. The base configuration chosen will depend upon the requirements for mounting and interface to control stations with digital keying.

Model	Mounting	Number of Channels supported	Supports Digital Interface to Control Station
L3179	Desktop	8 Max	No
L3249	Rackmount	8 Max	No
L3331	Desktop	8 Max	Yes - four
L3250	Rackmount	8 Max	Yes - four

The appropriate number of control modules must be ordered for the unit.

A CCM (Z100AB) and DCCM (Z102AB) each support two channels, the DCCM provides a 2 line display for alias and message/status decodes for each channel. The CCM provides space for a printed label to identify the channel. Each channel has three programmable buttons for functions such as Repeat Enable/disable, Multiple frequency selection, etc.

A SDCCM (Z103) support a single channel, providing a 2 line display for alias and message/status decodes. Each unit provides eight programmable buttons for functions such as Repeat Enable/disable, Multiple frequency selection, etc.

For TRC or E&M control no option is required, however for DC control order the DC Control Module (Z124). This will provide DC Control for up to four channels, if more channels require DC control then a second Z124 option should be ordered.

If a digital interface to a radio is to be used then order the DRCM (ZA00170AA), one is required for each radio. This option can only be used with the L3331 and L3250 models. A Digital Junction Box is required for each radio connected to a DRCM. For MCS2000 order a L3208 with option ZA00224AA. For ASTRO Console order a L3208 with option ZA00225AA. For a CDM1550 family radio order a L3239 and the following a CDM1550 Remote Kit (RLN4802) and Remote Cable Kit (RKN4077). The junction box allows up to six CommandSTAR Lite consoles to be connected to a radio.

If more than four DRCM's are required then order a Digital Remote Control Board (DDN6137) to field install and the additional DRCM options. Note the maximum amount of DRCM's that can be installed is six.

Connection from the CommandSTAR Lite to the RF equipment and Junction boxes is via two 50-way telco connectors using 25-pair cable. Channels 1-4 are on one connector and channels 5-8 are on the other. Order the appropriate cables (CDN6300, CDN6301 or CDN6302) and punch blocks (DDN6481).

If additional Auxiliary controls are required, above those supported by the initial ACM module, then order the appropriate number of option Z104AB. This option adds an ACM to the unit giving 16 more controls.

If telephone resources are required then an option Z118 is ordered. This option provides an interface to two separate POTS lines. Only one Z118 option is allowed.

A separate module connected to the CommandSTAR Lite supports relay outputs and Opto-coupled inputs. Each module supports 6 outputs and 12 inputs and the CommandSTAR Lite supports up to four I/O modules. The first I/O module is order as option Z114AB, which includes the module and cable. If there is a requirement for more modules to be connected to the console then a further three modules can be added. Ordering an I/O extension cable, CDN1304, and one to three I/O modules, CDN6179, as required achieve this.

The I/O modules obtain power from the CommandSTAR Lite, however, if the I/O module is not going to be co-located with the unit (i.e. within the standard cable length) then an external PSU (DDN7130) is required for the I/O module. If this PSU is used then only one I/O module can be connected to the I/O port and a custom cable is required. Details of how to make up this cable can be found in the Installation and Service manual. This cable does not include the power connections on the CES port.

Accessories can be ordered as required. The CommandSTAR Lite has a built in condenser microphone, but a desk microphone, HMN3000 or gooseneck microphone, TDN9941 can be used. If a footswitch is required order BLN6732 and up to two headset jacks, DDN6516, may be connected. A number of headsets are listed below, any of these may be used with the CommandSTAR Lite Console. These headset consist of two parts, a base and a top. A choice of two bases is (CDN6281 and CDN6282) and several tops is provided. For each headset to be connected a Headset Jack-box, Headset Base and Headset Top are required.

Capacity Limitations

The CommandSTAR Lite has some fundamental capacity limitations as detailed below:

Maximum number of channels supported = 8

Maximum number of Control Module options = 6

Therefore

$2 \times (\text{Qty of Z100AB} + \text{Qty of Z102AB}) + \text{Qty of Z103AB} + \text{Qty of ZA00170AB} \leq 8$

AND

$\text{Qty of Z100AB} + \text{Qty of Z102AB} + \text{Qty of Z103AB} + \text{Qty of Z104AB} + \text{Qty of ZA00170AB} \leq 6$

The table below gives examples of combinations that fit the rules above.

Type of Module			Number of Channels	Number of Modules
Dual Channel Z100 and Z102	Single Channel Z103 and ZA00170	ACM Z104		
0	6	0	6	6
1	5	0	7	6
2	4	0	8	6
3	2	1	8	6
4	0	2	8	6
0	1	5	1	6
0	2	4	2	6
0	3	3	3	6
0	4	2	4	6
0	5	1	5	6
0	6	0	6	6

CommandSTAR Lite Structure

Description	Nomenclature
Models	
8 CHANNEL DESKTOP CONSOLE Desktop console with capacity for eight analog channels, supporting TRC, DC or E&M control Includes Power Supply, Select and Unselect speakers, Keypad module and one Auxiliary Control Module. Appropriate Control Modules must be ordered, a maximum of six additional modules can be added.	L3179
8 CHANNEL RACKMOUNT CONSOLE Rackmount console with capacity for eight analog channels, supporting TRC, DC or E&M control Includes Power Supply, Select and Unselect speakers, Keypad module and one Auxiliary Control Module. Appropriate Control Modules must be ordered, a maximum of six additional modules can be added.	L3249
8 CHANNEL RACKMOUNT CONSOLE W/ DIGITAL CONTROL CAPABILITY Rackmount console with capacity for eight analog channels, supporting TRC, DC, and E&M control with the capability to support four radios via digital control. Includes Power Supply, Select and Unselect speakers, Keypad module and one Auxiliary Control Module. Appropriate Control Modules must be ordered, a maximum of six additional modules can be added.	L3250
8 CHANNEL DESKTOP CONSOLE W/ DIGITAL CONTROL CAPABILITY Desktop console with capacity for eight analog channels, supporting TRC, DC, and E&M control with the capability to support four radios via digital control. Includes Power Supply, Select and Unselect speakers, Keypad module and one Auxiliary Control Module. Appropriate Control Modules must be ordered, a maximum of six additional modules can be added.	L3331

Description

Nomenclature

Interfaces

ADD: DUAL RADIO CH. CNTRL MOD (CCM) Supports two analog channels. No display - fixed labels can be used to identify channel. Three option buttons available per channel.	Z100AB
ADD: DUAL DISP CHAN. CNTRL MOD (DCCM) Supports two analog channels, includes 2 line by 8 character display for each channel. Three option buttons available per channel for custom programming.	Z102AB
SINGLE DCCM (DISPLAY CHANNEL CONTROL MODULE) Supports a single analog channel, includes 2 line by 8 character display. Eight option buttons available for custom programming.	Z103AB
ADD: AUXILIARY CNTRL MODULE (ACM) Adds 16 additional function control buttons and associated LEDs to be customer programmed. Features supported include I/O Control, Paging format selection and Signaling	Z104AB
ADD: I/O MODULE WITH CABLE Provides 12 Opto-coupled inputs and 6 form-C Relay outputs. I/Os are associated to ACM Buttons and LEDs for control and indication. If further I/Os are required order one CDN1304 and up to 3 CDN6179 units.	Z114AB
ADD: 2 CO PHONE LINES Adds interface for 2 CO telephone lines, each line supports Caller ID. The following controls are required for each line; Off-hook, Talk, Hold and Release. These are accessed via ACM buttons. Only one module can be ordered per unit.	Z118
ADD: DC CONTROL MODULE Provides DC control for up to 4 channels. A maximum of two modules can be ordered per unit.	Z124
RETURN LABEL FOR TRADE-IN PROGRAM Trade in allowance for trading in a CommandPlus. Account is credited after Motorola receives trade in unit. \$750 will be credited when an L3179, L3249, L3250 or L3331 is purchased.	Z635AB
ADD: DIGITAL RADIO CONTROL MODULE (DRCM) Supports a single digital control channel, radios supported are: ASTRO Spectra Consolette (W9) MCS2000 (Model III) CDM1550 family (LS, LS+) The buttons and indicators on the module are mapped to the radio control head. Each radio to be controlled via DRCM requires a Digital Junction Box and appropriate cable.	ZA00170AA

Description	Nomenclature
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Cable(s)

CSDM XT COMPUTER CABLE 25FT. Used for connecting CommandSTAR Lite to DB25 serial port on CSDM PC	CDN6181
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CSDM AT COMP. CABLE 25FT Used for connecting CommandSTAR Lite to DB9 serial port on CSDM PC	CDN6182
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15 FOOT TELCO CABLE Twenty five pair telco cable, one 50-pin male connector (rear-entry) and one 50-pin female connector (right angle).	CDN6300
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50 FOOT TELCO CABLE Twenty five pair telco cable, one 50-pin male connector (rear-entry) and one 50-pin female connector (right angle).	CDN6301
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100 FOOT TELCO CABLE Twenty five pair telco cable, one 50-pin male connector (rear-entry) and one 50-pin female connector (right angle).	CDN6302
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PUNCH BLOCK WITH SPARK GAP	DDN6481
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Input/Output Modules

LINK CABLE FOR ADDITIONAL I/O MODULES Provides the ability to connect a total of four I/O modules to a CommandSTAR Lite. Only one link cable is needed to connect I/O modules 2 through 4.	CDN1304
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I/O MODULE External Module providing 12 Opto-coupled inputs and 6 Form-C relay inputs.	CDN6179
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CABLE FOR I/O MOD FOR CMDSTAR LITE Cable to connect I/O module to CommandSTAR Lite	DDN6128
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Microphones

DESK MICROPHONE, BLACK	HMN3000
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GOOSENECK MICROPHONE FOR DESKTOP CONSOLE	TDN9941
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Description	Nomenclature
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Power Supply

110/220V 50/60HZ AC POWER SUPPLY DESKTOP	DDN6125
POWER SUPPLY UNIT FOR I/O MODULE	DDN7130
110/220V 50/60HZ AC POWER SUPPLY RACKMOUNT	DDN7243

Field Replacement Units

SPARE UNSELECT SPEAKER For replacement only. Order CDN1302 for multi unselect audio output.	CDN1306
CABLE, SPEAKER TO INTERCONNECT BOARD (DB9-DB9) Connects select or unselect speaker to master panel PC board. 24 inch.	CDN1307
TWO PHONE LINE MODULE Interface board for 2 phone lines. Note for CommandSTAR: Does NOT fill slot in tower.	CDN6275
FOUR CHANNEL EXPANSION BOARD Only available for L3178	DDN6127
DUAL CHANNEL CONTROL MOD (CCM)	DDN6130
DUAL DISPLAY CHAN. CONTROL MOD (DCCM)	DDN6131
AUXILIARY CONTROL MODULE (ACM)	DDN6132
DIGITAL REMOTE CONTROL BOARD	DDN6137
DIGITAL RADIO CONTROL MODULE (DRCM)	DDN6138
SINGLE DISPL CHAN. CNTRL. MOD (SDCCM)	DDN6696
RACKMOUNT SELECT SPEAKER MODULE	DDN6697
CABLE, ELECTRONICS BOX TO PANEL FRAME (DB25M-DB25F)	DDN6698
DC SIGNALLING BOARD FOR DAP	TDN9897

Functional Product Specifications

General Specifications

Dimensions	Desktop = 7" (18 cm)H x 18" (46 cm)W x 13" (33 cm)D* * Increase depth by 4" (10 cm) to allow room for cabling
Weight	Not to exceed 7.7. kg (17 lb.)
Temperature Range	0°C to 50°C
Humidity	95% at 50°C (non-condensing)
Control Type	16-bit microprocessor
Audio Switch Type	Time-division-multiplex
Voice Digitization	64 Kbs uLAW PCM
Electrostatic Discharge Immunity	15, 000 volts on all exposed operator control areas. At 4kV no operation is disturbed and at 15kV no permanent failures.
Flammability	All plastic parts used in operator controls comply with UL 94V-0 flammability standards.
Line Protection	Fast-acting solid-state surge protection.
Memory Protection	Settings preserved in non-volatile memory.
Maximum number or remote	10 parallel units

End-to-end Specifications

Frequency Response	300 to 3300 Hz+1, -3 dB @ less than 2% distortion.
Hum and Noise	65 dB below rated output at any port.
Cross Talk	Less than -65 dB at 0 dBm transmit level.
Level Control	Digital Automatic Gain Control (AGC). Gain adjustment performed through Digital Signal Processors (DSP's). Gain will not increase in the presence of noise or in the absence of voice. Constant output (less than 3 dB change) for all voice input levels over the rated range: Microphone: -60 to -22 dBm Receive line: -65 to 11 dBm

Base Station Controls

Channel Control	Each channel can be separately configured for Local, E&M, Tone or DC control.
Tone Control	Guard tone and one function tone in the 300 to 3300 Hz range, frequency adjustable in 0.1 Hz increments. Total tone duration adjustable from 0 to 60000 ms in 1 ms increments. Parallel status update on function tones (550 to 2050 Hz in 100 Hz increments. Guard tone configurable for 2100 Hz, 2175 Hz, 2300 Hz, or 2325 Hz.
DC Control	125 DC. Positive and negative currents (0.5 to 12.5 mA in 0.5 mA increments). Maximum loop resistance including base station termination: 10K Ohms.

Transmit Line Outputs

Line Output	Adjustable from -40 to 11 dBm.
Output Impedance	600 Ohm or 10K Ohm.

Receiver Line Outputs

Receive Sensibility	Adjustable from –40 to 11 dBm.
Call Light Sensitivity	Adjustable from –5 to –32dB, per receive sensitivity.
Line Balance	60 dB @ 1004 Hz.
Input Impedance	600 Ohm or 10K Ohm.

Other Audio Ports

Recorder Port (per channel)	The output shall consist of summed transmit / receive audio of the channel with a 2175 Hz filter. The output level shall be programmable from –40 to +11 dBm into 600 Ohm.
Recorder Port (per console)	The output shall consist of mixed selective receive audio (telephone and radio) and the operator's transmit audio. A fix nominal output of –10 dBm into 600 Ohm.
Aux./Paging Input	Adjustable from –40 to +11 dBm, balanced 600 Ohm input.

Audio Controls

Individual Volume	0 to –21 dB in 8 discrete 3 dB steps. Muting configurable for –24 dB or full mute.
All Mute	24 dB or full muting of unselected channels with timer programmable from 1 to 120 seconds or for infinite duration.

Status Outputs and Inputs

Panel Indicators	Solid state LED indicators. Red, yellow or green depending on function.
PTT Relay	Form A dry closure. 150 mA, 60 VDC non-inductive load.
Auxiliary Outputs	Form C dry closures. 150 mA, 60 VDC non-inductive load.
Auxiliary Inputs	Opto-coupled inputs, 5kOhms impedance, 5 to 20 MA input current.

Power Supply

AC Input Voltage	110-240 VAC, 6A max.
Input Frequency	50/60 Hz, +/-3Hz
Power Output	110 watt max
DC Outputs	V1 +5Vdc @ 10 amps V2 -5Vdc @ 1 amps V3 +12Vdc @ 5 amps V4 -12Vdc @ 1 amps
Agency Approvals	UL (Underwriters Laboratories) CSA (Canadian Standards Association) CE Mark (Conformité Européenne)

Glossary

ACM	Auxiliary Control Module
CSDM Lite	CommandSTAR Lite System Database Manager; a DOS-compatible software program
CTCSS	Continuous Tone Carrier Squelch System
DCCM	Dual Channel Control Module
DA	Direct Access
dB	decibel; a unit used to express relative difference in power, usually between acoustic and electric signals, equal to ten times the common logarithm of the ratio of the two levels
dBm	decibel relative to 1 milliwatt
DC	Direct Current
DTMF	dual-tone multi-frequency; the tones sent out by a touch tone dialing unit
Emer	Emergency
Hz	A unit of frequency equal to one cycle
I/F	Interface
I/O	Input/Output
I/A	Indirect Access
IC	Intercom
KHz	kilo-Hertz; thousand Hertz (thousand cycles per second)
LED	Light Emitting Diode; used on the console for status lights
P/A	Public Address
Prog	Program
PTT	Push (or Press) To Talk
RAC	Repeater Access Control
RCU	Remote Control Unit
RX, Rx	Receive, Received, Receiving
TX, Tx	Transmit, Transmitted, Transmitting
VOL	Volume
VOX	Voice-Operated Switch
VU	Visual volume display unit