



**Computer Controlled Data Interface  
Software Requirements Specification  
(Partial)**

Orca Development Project

**Issue 1.04a**  
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**NOTE: This document is a subset of the original Computer Controlled Data Interface Software Requirements Specification. It includes all relevant information relating to the sending and receiving of Short Data Messages on the Tait Orca Conventional radios. This document has been compiled primarily for the ALCATEL organisation.**

## **Document History**

14 February 2000      Kelly Meyers

Created a partial CCDI requirements document based on the Tait Orca CCDI Software Requirements Specification issue 1.04. This new document contains only relevant information relating to the sending and receiving of SDMs. All other CCDI interface and protocol requirements have been removed. Note that this is NOT an approved and controlled document.

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## TABLE OF CONTENTS

1. INTRODUCTION.....	4
1.1 PURPOSE.....	4
1.2 SCOPE.....	4
1.3 GLOSSARY.....	4
1.4 REFERENCES.....	4
1.5 GUIDE TO DOCUMENT.....	4
1.5.1 Document Organisation.....	4
1.5.1.1 Section 1.....	4
1.5.1.2 Section 2.....	4
1.5.1.3 Section 3.....	4
1.5.1.4 Section 4.....	4
1.5.2 Document Conventions.....	4
1.5.2.1 Supporting Information.....	4
1.5.2.2 Measurement Tolerance.....	5
1.5.2.3 Number Bases.....	5
2. PRODUCT OVERVIEW.....	6
2.1 Product.....	6
2.2 Serial Communication Parameters.....	6
2.3 Programmable DATA parameters.....	6
3. COMMAND PROTOCOL.....	8
3.1 Command mode.....	8
3.2 Switching Modes.....	8
4. COMMAND DESCRIPTION.....	9
4.1 MESSAGE FORMAT.....	9
4.1.1 Calculating [CHECKSUM].....	10
4.2 COMMANDS TO RU.....	10
4.2.1 DIAL.....	10
4.2.2 GO_TO_CHANNEL.....	11
4.2.3 CANCEL.....	12
4.2.4 FUNCTION.....	12
4.2.5 QUERY.....	14
4.2.6 SEND_SDM.....	15
4.3 RESPONSES FROM RU.....	16
4.3.1 Transaction OK.....	16
4.3.2 ERROR.....	17
4.3.3 MODEL.....	18
4.3.4 RING.....	18
4.3.5 PROGRESS.....	19
4.3.6 GET_SDM.....	22

## 1. INTRODUCTION

### 1.1 PURPOSE

This document specifies a subset of the Software Requirements for the Computer Controlled Data Interface (CCDI) for the Tait Orca Conventional Radios. This document describes how the CCDI works while under the control of the radio software and its protocol commands. This document is intended primarily for software engineers involved in the implementation of products associated with the Tait Orca CCDI.

### 1.2 SCOPE

This document covers:

- X Description of the Computer Controlled Data Interface
- X Details of the command protocol used between the Tait Orca Conventional Radio and the computer equipment.

### 1.3 GLOSSARY

CCDI	Computer Controlled Data Interface - the command protocol which allows communication between a CE and a RU.
CE	Computer Equipment - the >intelligent= device which controls the RU and/or receives data over the interface.
RU	A Tait Orca Conventional Radio Unit.
SDM	Short Data Message.

### 1.4 REFERENCES

None

### 1.5 GUIDE TO DOCUMENT

The structure of this document is based upon the standard SRS template.

#### 1.5.1 Document Organisation

##### **1.5.1.1 Section 1**

This section provides an introduction to the document including its purpose, scope, a glossary of terms, and a list of referenced documents.

##### 1.5.1.1 Section 2

This section provides an overview of the product.

##### 1.5.1.2 Section 3

This section describes the command protocol.

##### 1.5.1.3 Section 4

This section describes the details of the commands.

#### 1.5.2 Document Conventions

##### **1.5.2.1 Supporting Information**

Throughout this document additional background information is provided. This information does not form part of the

requirements per se, but is provided to assist the reader in understanding the intent of the requirements. This information is represented as follows:

*(INFO: Applies to full off air call systems. A characteristic of these type of systems ...)*

#### 1.5.2.1 Measurement Tolerance

The general tolerance on any measurement specification is  $\nabla$  5% unless otherwise indicated.

#### 1.5.2.2 Number Bases

All numeric values are decimal unless otherwise indicated.

Hexadecimal numbers are represented by the suffix Ah $\equiv$  and represent a whole number of bytes (i.e. 2Ah is a single byte having the decimal value 42).

## 2. PRODUCT OVERVIEW

### 2.1 Product

The Computer Controlled Data Interface is intended to provide a means of controlling a Tait Orca Conventional radio from some form of CE. Such control would allow the implementation of either a semi or fully automatic communications system.

Potential applications include:

- \* Computerised despatcher terminals
- \* Remote outstations (data logging, security monitor etc.)
- \* Data radio terminals

The CCDI is a command protocol which is embedded in the radio software. It requires an appropriate serial cable, such as the Tait Programming Lead, to establish a RS-232 link between a CE and a RU.

The features offered by the CCDI are determined by its command protocol. These will apply to the Conventional radio but not to the Trunked radio. The command protocol determines how and what the user can control on the radio. Section 4. COMMAND DESCRIPTION is devoted to describing the command protocol.

### 2.2 Serial Communication Parameters

The RS232 communication between the CE and the RU requires the following parameters:

- \* Baud rate = 9600
- \* Number of data bits = 8
- \* Parity = none
- \* Number of stop bits = 1

*(INFO : The CCDI communication parameters are not programmable.)*

### 2.3 Programmable DATA parameters

The following parameters must be programmed properly for a RU before CCDI can operate:

- |                            |  |
|----------------------------|--|
| * Data Option              | This is for enabling or disabling CCDI operation in the RU.<br>- If enabled, RU processes all valid CCDI commands including SEND_SDM command.<br>- If disabled, RU ignores any CCDI commands including SEND_SDM command.<br>- Note that receiving SDM data and sending SDM data on Tait Orca Eclipse Handportable radios depend upon the SDM Option. |
| * Data Identity            | This inputs the data message ID for SDM calls and DATA calls. A maximum of 8 alphanumeric characters including the wildcard character >*= can be entered.  |
| * SDM Option               | This enables/disables sending and receiving SDM data on the radio.   |
| * SDM Auto Acknowledge     | This enables/disables the checking and sending of SDM auto acknowledgements.   |
| * Wait For Acknowledgement | When >SDM Auto Acknowledgement= is enabled, after sending SDM data, if   |

SDM acknowledgement is received within this time, RU indicates *SDM\_ACK\_RECEIVED\_INDICATOR*. Otherwise RU indicates *SDM\_NO\_ACK\_RECEIVED\_INDICATOR*.

- \* Auto Acknowledge Delay      When >SDM Auto Acknowledgement= is enabled, after RU receives SDM data, RU sends SDM acknowledgement after the auto acknowledge delay.
- \* Lead In Delay                This lead-in-delay is applied when transmitting data in Transparent mode or sending SDM data on Tait Orca Eclipse Handportable radios.
- \* Handshaking:  
  XON/XOFF characters        These are character definitions which are used for Software Handshaking to prevent losing data between CE and RU.
- \* Ignore Subaudible Signalling      This is for enabling or disabling checking subaudible signalling when receiving data in Transparent mode or SDM data.
  - When enabled, RU ignores any received FFSK data if subaudible signalling is not valid.
  - When disabled, RU processes any valid FFSK data whether subaudible signalling is valid or not.

Note that these parameters are in the AData Parameters≅ page of the programming software for the Tait Orca Conventional radio.

### 3. COMMAND PROTOCOL

The CE is connected to the RU via RS232 serial link. Commands are generated by the CE and responses/status messages returned by the RU. By means of a special command message the CCDI can be transparent to the CE and a connection can be made between the CE and the RU modem. Also by receiving a special message from the modem, CCDI lets the RU go into a mode where any messages from the CE are ignored and only the messages received by the modem are executed and responses are returned thru the modem. Thus following modes of operation are defined:

Command mode                      The mode in which the CE communicates directly to the RU via a set of defined messages.

In Command mode, there is a set format for messages and mechanisms for detecting communication errors.

Note : In order to process CCDI commands, the Data Option must be enabled by using the programming software.

#### 3.1 Command mode

The CCDI normally operates in Command mode. This is the default mode upon power up of the RU. Control of the RU is accomplished by the CE sending a command sequence (packet) and receiving a response (a transaction). Unsolicited messages may originate from the RU if there is a significant change of state inside the RU that the CE should be aware of.

The RU will issue a prompt character to indicate to the CE that it is ready to accept a new command. After issuing a command the CE must wait for another prompt before beginning the next transaction. The prompt character is A.≡ (full stop, ASCII code = 2Eh).

Messages directed to the RU will always be responded to, either explicitly by means of a return message, or implicitly by just the prompt being issued. The RU will not originate a message to which a reply is expected (unsolicited messages from the RU are for information purposes only).

In Command mode, if the RU receives any data from the modem, then RU sends a message to the CE indicating that data has been received from the modem.

#### 3.2 Switching Modes

Mode switching is always initiated by the CE.

Upon powerup, the CCDI always comes up in Command mode.



## 4. COMMAND DESCRIPTION

This section details the standard commands and responses.

### 4.1 MESSAGE FORMAT

All message packets take the general form:

[IDENT][SIZE][PARAMETERS][CHECKSUM]<CR>

[IDENT]	The message identifier. Identifiers are single ASCII characters (lower-case alphabetical) which categorise the message type.
[SIZE]	The number of characters which make up the [PARAMETERS] field. [SIZE] is an 8-bit number expressed in ASCII-hex notation (two characters).
[PARAMETERS]	An optional field, depending upon the command. Parameter values are generally character strings unless explicitly stated otherwise. Parameter type is dependent upon the command - there is no explicit type definition.
[CHECKSUM]	An 8-bit checksum of fields [IDENT], [SIZE] and [PARAMETERS]. It is expressed in ASCII-hex notation (two characters).
<CR>	The packet terminator. It is the ASCII A carriage return character (0Dh).

General characteristics of the message format worth noting are:

- \* All characters in a message are printable ASCII.
- \* Where numeric values are represented in ASCII-hex notation (two characters per byte), digits A..F are upper case.
- \* The minimum length of a command packet is 5 characters i.e. when [SIZE] = 00. For example, c003D is the CANCEL command which is 5 characters.
- \* The maximum length of the [PARAMETERS] field is 32 characters. The maximum length of the command packet is therefore 37([SIZE]=20") characters.
- \* An example of a message line is as follows:

d0601234507

Ad is the message [IDENT], in this case describing that this message is a ADIAL command.

A06" is the message [SIZE], describing that there are 6 characters of data to follow in the [PARAMETERS] field.

A012345" are the data bytes in the [PARAMETERS] field.

A07" is the calculated checksum of the message line.

The actual data that will be sent out the port in hexadecimal form is:

---

64 30 36 30 31 32 33 34 35 30 37

#### 4.1.1 Calculating [CHECKSUM]

[CHECKSUM] is calculated by applying the following algorithm:

1. Take the modulo-2 sum of all message bytes preceding [CHECKSUM].
2. Retain bits 0...7, discarding any higher order bits resulting from the summation.
3. Form the two's complement of the remainder.
4. Convert the binary number into two ASCII-hex digits, MSD first.
5. Taking the same example used above, d0601234507, the checksum of the above message is calculated as follows:

Take the sum of all message bytes and retain only bits 0...7.

Hex addition : 64h + 30h + 36h + 30h + 31h + 32h + 33h + 34h + 35h = F9h

Take the two's complement of F9h = 07h

## 4.2 COMMANDS TO RU

The following commands are available to the CE to control operation of the RU;

DIAL	Make a call
GO_TO_CHANNEL	Go to channel
CANCEL	Abort current activities
FUNCTION	Implement RU function
QUERY	Identify RU type
SEND_SDM	Send a Short Data Message (SDM).

In all cases, if the command is received without error by the RU and all parameters are valid, the command will be executed and the prompt will be returned to the CE. If an error arises, the CE will be notified with an appropriate response.

#### 4.2.1 DIAL

The DIAL command allows access to the full dialling capability of the RU. Selcall and/or DTMF sequences may be dialled (on the current channel).

[IDENT] Ad≡  
[PARAMETERS] [DTYPE][NUMBER\_STR]

[DTYPE] A single character representing the type of dialling required:

0 = SELCALL (Conventional radio only)

1 = DTMF (Conventional radio only)

2 = Reserved for Trunked radio dialling.

[NUMBER\_STR] A string of character representing the dialled sequence. The range of allowed characters depends upon the value of [DTYPE]:

[DTYPE] = 0, range = 0...9, A...F, -, V (maximum of 32 digits)  
 [DTYPE] = 1, range = 0...9, A...D, \*, #,- (maximum of 32 digits)

Note : The DIAL command initiates the calling process only. The call may take some time to get through, especially if the channel is busy or the system heavily loaded. The RU will return a ATransaction OK≡ message as soon as the DIAL command is accepted, but the CE may have to wait for a PROGRESS message advising of successful call set-up before proceeding.

#### Notes

1. Selcall strings usually utilise the digits 0...9. Some of the tones A...F have special meaning, i.e. A = Group; C = Reset; E = Repeat.
2. The maximum number of digits in a Selcall string is 32.
3. Selcall calls are made within the bounds of the following parameters, as programmed into the RU: tone period, tone set and lead-in delay, etc.
4. DTMF digits A...D are not normally accessible from the keypad of the RU but are included here for completeness.
5. The maximum number of digits in a DTMF string is (nominally) 32.
6. DTMF calls are made within the bounds of the following parameters, as programmed into the RU: key-up delay, tone period and inter-tone gap, etc.
7. Examples of DIAL command would be:

d0601234507            This message specifies a Selcall dialling of the number 1 2 3 4 5.

d0611234506            This message specifies a DTMF dialling of the number 1 2 3 4 5.

#### 4.2.2 GO\_TO\_CHANNEL

The GO\_TO\_CHANNEL command forces the RU to change to another channel.

[IDENT]            Ag≡

[PARAMETERS]      [CHANNEL\_NO]

[CHANNEL\_NO]      A string of characters representing the new channel number. The range of allowed characters is 0...9 only and the maximum number of digits is 3.

#### Notes

1. The value of the new channel number must be valid for the RU being controlled (range of allowed values depends upon the RU=s programming).
2. The maximum number of digits in the [CHANNEL\_NUMBER] string is 3.
3. Examples of GO\_TO\_CHANNEL command would be:

g0245CE            This message specifies a channel change to channel 45.

g03100A5            This message specifies a channel change to channel 100.

### 4.2.3 CANCEL

The CANCEL command allows the CE to abort the current action the RU is performing.

[IDENT]        Ac≡

[PARAMETERS]        [CANCEL\_TYPE]

[CANCEL\_TYPE]        A single character representing the cancelling type.  
                           0 = cancel call.  
                           1 = delete SDM data.

#### Notes

1.        When [CANCEL\_TYPE] = 0,  
           the CANCEL command will force the RU to do the following:
  - clear down a Selcall call if the radio is alerting;
  - cancel deferred calling if it is in progress;
  - take the RU out of emergency mode if the radio is currently in the AEmergency Tx Rx cycles≡;
  - cancel any Selcall call retries.
2.        When [CANCEL\_TYPE] = 1,  
           the CANCEL command will delete last received SDM data. If there is no valid SDM data, it will do nothing.
3.        Examples of a CANCEL command would be:

c0100C        This message specifies a cancel call command.  
 c0110B        This message specifies a delete SDM command.

### 4.2.4 FUNCTION

The FUNCTION command provides access to various radio hardware and miscellaneous functions.

[IDENT]        Af≡

[PARAMETERS]        [FUNCTION][QUALIFIER]

[FUNCTION]        A single character representing the required function category.

[QUALIFIER]        A character string representing the action to be taken. The meaning of [QUALIFIER] is dependent upon the value of [FUNCTION].

The following describes each [FUNCTION] category and its [QUALIFIER] values.

[FUNCTION] = 0        currently not supported.  
                           [QUALIFIER] = none

[FUNCTION] = 1        Set signalling status (Orca Eclipse radio only)  
                           [QUALIFIER] = two BCD digit new status

[FUNCTION] = 2        AUX control (Mobile radio only)  
                           [QUALIFIER] = 0 : deactivate AUX signal  
                           [QUALIFIER] = 1 : activate AUX signal

[FUNCTION] = 3        Hook control (Mobile radio only)

---

	[QUALIFIER] = 0 : force mic. Aon-hook≡ [QUALIFIER] = 1 : force mic. Aoff-hook≡
[FUNCTION] = 4	User controls [QUALIFIER] = 0 : disable all user controls [QUALIFIER] = 1 : disable user input only [QUALIFIER] = 2 : enable all user controls
[FUNCTION] = 5	Receiver audio mute control [QUALIFIER] = 0 : cancel request CCDI mute rx audio [QUALIFIER] = 1 : request CCDI mute rx audio
[FUNCTION] = 6	TMODE Filter control [QUALIFIER] = 0 : deactivate TMODE Filter [QUALIFIER] = 1 : activate TMODE Filter
[FUNCTION] = 7	Subsignalling validity control [QUALIFIER] = 0 : deactivate validation of sub signalling [QUALIFIER] = 1 : activate validation of sub signalling
[FUNCTION] = 8	Monitor control [QUALIFIER] = 0 : deactivate monitor [QUALIFIER] = 1 : activate monitor
[FUNCTION] = 9	Tx/Rx control [QUALIFIER] = 0 : change to Rx state [QUALIFIER] = 1 : change to Tx state

#### Notes

1. The FUNCTION 0 is reserved for later use.
2. The ASet signalling status≡ loads a new value into the status variable in the RU. This value is transmitted whenever a status call is made from the front panel of the RU or the RU transponds to signalling received from some other party. The range of allowed characters is 0...9 only and the number of digits must be 2.
3. Mobile radio only.  
The AAUX control≡ function sets the state of the AUX control signal on the options connector inside the RU. This signal may be used for any switching purpose.

The RU will only support this function if it has been programmed with the AUX key controlling the auxiliary line. This may be a AMomentary≡ or ALatching≡ AUX key. In these cases, this function command will operate in parallel with the operation of the RU AUX key.

The state of the AUX signal line is preserved after a reset of the RU. Care must be taken to ensure it is always in the correct state for the application after power-up.

4. Mobile radio only.  
The AHook control≡ function operates in parallel with the microphone hookswitch. The CE may use this function to enable and disable signalling mutes, and also continue and suspend scanning.
5. The AUser controls≡ function allows the CE to selectively disable the front panel controls of the RU. Three states are defined:
  - Disable All User Controls  
This disables all user inputs and all indicators including the display. The RU will indicate ACCDI BUSY≡

indication.

- Disable User Input Only

This disables all user inputs but the display and other indicators will be enabled for user information. Any attempt on user input will result in the invalid keypress tone being sounded.

- Enable All User Controls

This enables the RU to be used normally except when the CCDI is processing a message. When the CCDI is processing a message, the RU will indicate ACCDI BUSY≡. When processing is complete, the RU will be returned to its normal state.

Note that after power on, this parameter value is defaulted to AEnable All User Controls≡.

6. The AReceiver audio mute control≡ function will request or cancel its request for a ACCDI mute≡ of the RU. This mute request will affect the mute state of the RU and can only be overwritten by the ASquelch Override≡ of the RU.
7. The ATMODE Filter control≡ function will activate or deactivate filtering out two progress messages of ARECEIVER BUSY≡ and ARECEIVER NOT BUSY≡, in the Transparent mode. Note that after power on, this parameter value is defaulted to Aactivate TMODE Filter≡.
8. The ASubsignalling validity control≡ function will activate or deactivate validation of subsignalling, i.e. CTCSS or DCS when CCDI is receiving FFSK data. If the current channel is not programmed with any subsignalling, then FFSK data is always received regardless of the validation state. Note that after power on, this parameter value is depending on >Ignore Subaudible Signalling= option value.
9. Conventional radio and Trunked radio in conventional mode. The AMonitor control≡ function will activate or deactivate monitoring of the RU. If this message is received in traffic channel in Trunked radio, then a parameter error message will be sent to CE.
10. The ATx/Rx control≡ function will change the RU into Tx or Rx state.
11. The [FUNCTION] numbers 1 to 6 are compatible to T2000, but numbers 7, 8, and 9 are newly added.
12. Examples of FUNCTION command would be:
 

f03100A6	This message specifies a set status command requesting an update of the current status digit to status digit 00.
f0221D5	This message specifies an activate AUX signal command.
f0230D5	This message specifies an on-hook command.
f0241D3	This message specifies a disable user input command.
f0250D3	This message specifies a receiver audio mute control command.
f0261D1	This message specifies an activate TMODE Filter command.
f0271D0	This message specifies a validation of sub signalling.
f0281CF	This message specifies an activate MONITOR command.
f0291CE	This message specifies a set to Tx state command.

#### 4.2.5 QUERY

The QUERY command requests the RU to respond with a block of data identifying the type of RU attached and the version of its CCDI software.

[IDENT]	Aq≡
[PARAMETERS]	[QUERY_TYPE]
[QUERY_TYPE]	A single character representing the query type. 0 = query model message. 1 = query SDM message.

#### Notes

1. When [QUERY\_TYPE] = 0, the ID. data is returned to the CE as a MODEL message. However the [PARAMETERS] of MODEL message is now modified. (See 4.3.3)
2. When [QUERY\_TYPE] = 1, the SDM message is returned to the CE as a GET\_SDM message.(See 4.3.6)
3. Examples of the QUERY command would be:

q010FE This messages specifies a QUERY command, requesting the MODEL message.  
q011FD This message specifies a QUERY command, requesting the GET\_SDM message.

#### 4.2.6 SEND\_SDM

The SEND\_SDM command requests the RU to send a Short Data Message (SDM):

[IDENT]	As≡
[PARAMETERS]	[LEAD_IN_DELAY][DATA_MESSAGE_ID][MESSAGE]
[LEAD_IN_DELAY]	2 byte characters representing the key-up lead in delay (range = 00 to FF).
[DATA_MESSAGE_ID]	8 byte characters representing the data message ID.
[MESSAGE]	Maximum 32 characters of SDM data. (Optional)

#### Notes

1. The SEND\_SDM command can send maximum of 32 characters ONLY in command mode. However a RU can receive SDM either in Command mode or Transparent mode.
2. The [LEAD\_IN\_DELAY] parameter representing the key-up lead in delay which can be 00 to FF. The actual lead in delay is calculated by multiplying this number by 20 msec. However a minimum 100 msec of lead in delay is required, hence when 00 to 04 is inputted the actual lead in delay will be 100 msec. Thus the actual lead in delay shall be minimum 100 msec to maximum 5.12 sec by step of 20 msec.
3. [DATA\_MESSAGE\_ID] is a 8 character string representing the data message ID of the radio which the SDM is sent to. It can be any alphanumeric characters. >\*= is the wildcard character. When a radio receives a SDM message, the data message ID is checked against the database of the radio. If the data message ID sent matches, then the received SDM data will be preserved and the radio will indicate this. Otherwise the SDM data will be ignored.
3. [MESSAGE] is optional and can be maximum of any 32 data. However when a RU is received SDM, it shall

display only the ASCII code of 20h to 7Fh. If a code is outside of this ASCII code range then it will be displayed either as a blank character or a random font. If the received SDM data is valid and includes [MESSAGE], then the RU will generate SDM call RING message to the CE. If the received SDM data is valid and does not include [MESSAGE], then the RU will generate DATA call RING message to the CE.

4. When >SDM Auto Acknowledgement= is enabled, after sending SDM data, if SDM acknowledge data is received within the time of >Wait For Acknowledgement=, RU indicates *SDM\_ACK\_RECEIVED\_INDICATOR*. Otherwise RU indicates *SDM\_NO\_ACK\_RECEIVED\_INDICATOR*.
5. In Command mode, if a SDM data is received whether it is valid or not, it will be buffered and the RU will generate a *FFSK\_DATA\_RECEIVED* progress message. If the received SDM data is valid , i.e the data message ID is matched, then the RU will also update the SDM data buffer and will generate a sound beep to indicate that RU has received a valid SDM data.
6. In Transparent mode, if a SDM data is received whether it is valid or not, it will be sent to the CE but no progress message is generated. If the received SDM data is valid , i.e the data message ID is matched, then the RU will also update the SDM data buffer and will generate a sound beep to indicate that RU has received a valid SDM data.
7. Note that if a SDM call is sent to a Tait Orca Elan Conventional radio, the RU will not do any indication. But the received message can be retrieved by the GET\_SDM message. Tait Orca Excel and Eclipse Conventional radios will indicate both by beeping and displaying ASDM≡ on LCD.
8. An example of SEND\_SDM command would be:

s0A051234567813      This message transmits data message ID A12345678≡ with 100 msec lead in delay thru current channel.  
s0CFF12345678Hi39    This message transmits data message ID A12345678≡ and SDM data AHi≡ with 5.1 sec lead in delay thru current channel.

### 4.3 RESPONSES FROM RU

The following messages may be returned to the CE as part of a CCDI transaction or as an unsolicited message indicating a significant change of state inside the RU:

Transaction OK Transaction processed OK

ERROR                  Transaction processing error

MODEL                  Identify RU type

RING                    Incoming call alert

PROGRESS              Call progress report

GET\_SDM                Get SDM data

Note that in all cases, the prompt character will be issued after the RU response to terminate the transaction and signify that another may begin.

#### 4.3.1 Transaction OK

Solicited.



This message confirms that the command has been received, is valid, and has been executed. No response will be issued to a command which meets the above criteria.

### 4.3.2 ERROR

Solicited and Unsolicited.

The ERROR message advises the CE that the RU has detected an error condition and cannot proceed with the current transaction (= a transaction error, solicited response). In some cases, an exception condition in the RU may cause an ERROR message to be sent to the CE independently of any control transactions (system error, unsolicited message).

[IDENT]           Ae≡

[PARAMETERS]       [ETYPE][ERRNUM]

[ETYPE]            Error type. A single character representing the error category.

[ERRNUM]           Error number. A character string representing a decimal number in the range of 00 to 99, which can identify the specific error condition.

The following describes each [ETYPE] and its [ERRNUM] values.

[ETYPE] = 0,           Transaction error  
                   [ERRNUM] = 01, unsupported command  
                   [ERRNUM] = 02, checksum error  
                   [ERRNUM] = 03, parameter error  
                   [ERRNUM] = 04, invalid terminating character  
                   [ERRNUM] = 05, RU not ready error  
                   [ERRNUM] = 10, communication failure

[ETYPE] = 1,           System error  
                   [ERRNUM] = Existing Ru system error numbers

#### Notes

1. All system errors ([ETYPE] = 1) are defined by the RU. In general, they will be a two character string representing some fatal condition which prevents the RU from operating correctly. Recovery procedures are defined by the RU.
2. Transaction errors ([ETYPE] = 0) indicate some problem with communications over the CCDI link. All such errors result in the transaction being terminated without the current command being executed.
3. Unsupported command errors (01) may arise when the CE expects a later version of RU than is attached and attempts to use a command which is not recognised by the RU.
4. A checksum error (02) indicates that the checksum calculated by the RU did not match the one received in the command packet.
5. Parameter errors (03) encompass values out of range or missing fields.
6. A character terminating error (04) may occur on a packet sent to the RU.
7. RU not ready error (05) occurs when another new message is receiving from CE even before a prompt character Ae≡ is sent from RU. This error is newly added.
8. Communication failure errors (10) encompass all low level mechanisms, i.e. framing error, overrun error,

parity error etc.

9. An example of the ERROR response message would be:

e03003A5                      This message indicates that the parameter of current received message is incorrect.

### 4.3.3                      MODEL

Solicited.

The MODEL message is sent to the CE in response to a QUERY command. It identifies the type of RU and the version of CCDI software operating in the RU.

[IDENT]                      Am≡

[PARAMETERS]                      [RUTYPE][RUMODEL][RUTIER][VERSION]

[RUTYPE]                      A single character representing the type of the RU.  
[RUTYPE] = 1, Conventional radio  
[RUTYPE] = 2, Reserved for Trunked radio

[RUMODEL]                      A single character representing the model of the RU.  
[RUMODEL] = 1, Handportable radio  
[RUMODEL] = 2, Mobile radio

[RUTIER]                      A single character representing the tier of the RU.  
[RUTIER] = 0, Tait Orca Elan radio  
[RUTIER] = 1, Tait Orca Excel radio  
[RUTIER] = 2, Tait Orca Eclipse radio

[VERSION]                      CCDI software version. A character string, in the format of XX.XX, identifying the capabilities of the RU operating in CCDI mode.

Notes

1. The value of [VERSION] = 1.01 is reserved for the first release of CCDI firmware implementing the command protocol described in this document. Subsequent enhancements and major upgrades will increment this number accordingly.
2. An example of the MODEL response message would be:

m0811100.01A9                      This message indicates that the RU is a Conventional Handportable Tait Orca Elan radio and the CCDI software version is 00.01.

### 4.3.4                      RING

Unsolicited.

The RING message advises the CE that an incoming call has been received.

[IDENT]                      Ar≡

[PARAMETERS]                      [RCATEGORY][TYPE][STATUS][CALLER\_ID]

[RCATEGORY]                      A single character representing the category of the incoming call arrived.

[RCATEGORY] = 0, Selcall  
 [RCATEGORY] = 1, Undefined  
 [RCATEGORY] = 2, Reserved for Trunked system call

[TYPE] A four character string qualifying the type of call received.  
 [TYPE] = [TYPE1][TYPE2][TYPE3][TYPE4]

[TYPE1] = 0, speech call  
 [TYPE1] = 1, Reserved for Trunked non prescribed data call  
 [TYPE1] = 2, status call  
 [TYPE1] = 3, interrogation call  
 [TYPE1] = 4, SDM call  
 [TYPE1] = 5, DATA call  
 [TYPE1] = 6, remote Monitor call

[TYPE2] = 0, normal priority  
 [TYPE2] = 1, emergency / priority

[TYPE3] = 0, individual call  
 [TYPE3] = 1, group call

[TYPE4] = 0, Reserved for not an include call (Trunked radio only)  
 [TYPE4] = 1, Reserved for include call (Trunked radio only)

[STATUS] A two digit string representing the received status for status calls.

[CALLER\_ID] It is caller=s ID which has a variable length.

#### Notes

1. The Trunked system call (when [RCATEGORY] = 2) includes all types of Trunked system call such as MPT1343, ZVEI, NOKIA, GONGAN, etc.
2. [TYPE4] is always A0", but value A1" is reserved for Trunked radio.
3. If [STATUS] value is not received when RU receives a call, then [STATUS] will be AFF≡.
4. [CALLER\_ID] field is optional. The length of received [CALLER\_ID] can be variable.
5. By checking [SIZE] in RING message, CE will be able to know if the whole [CALLER\_ID] part is missed or not.
6. An example of a RING response message would be:

r0714000FFA6 This message indicates that the received call is a normal SDM call.

#### 4.3.5 PROGRESS

Unsolicited.

The PROGRESS message advises the CE of RU status when some significant change of state in the radio occurs (typically during call processing).

[IDENT] Ap≡

[PARAMETERS]            [PTYPE][PARA1][PARA2]

[PTYPE]                    A two digit string representing a decimal number in the range of 00 to 99 which can identify the progress message category from the defined list.

[PTYPE] = 00, SELCALL ANSWERED  
 [PTYPE] = 01, DEFERRED CALLING  
 [PTYPE] = 02, TX INHIBITED  
 [PTYPE] = 03, EMERGENCY MODE INITIATED  
 [PTYPE] = 04, EMERGENCY MODE TERMINATED  
 [PTYPE] = 05, RECEIVER BUSY \*  
 [PTYPE] = 06, RECEIVER NOT BUSY \*  
 [PTYPE] = 07, PTT MIC ACTIVATED  
 [PTYPE] = 08, PTT MIC DEACTIVATED

[PTYPE] = 09, Reserved for CALL SET UP IN PROGRESS of Trunked radio  
 [PTYPE] = 10, Reserved for STRING NOT ACCEPTED of Trunked radio  
 [PTYPE] = 11, Reserved for CALL FAILED of Trunked radio  
 [PTYPE] = 12, Reserved for ALERT of Trunked radio  
 [PTYPE] = 13, Reserved for GO TO CHANNEL of Trunked radio  
 [PTYPE] = 14, Reserved for TRANSACTION CONFIRMED of Trunked radio  
 [PTYPE] = 15, Reserved for CALL CLEAR of Trunked radio  
 [PTYPE] = 16, Reserved for SERVICE of Trunked radio  
 [PTYPE] = 17, Reserved for CALL QUEUED of Trunked radio  
 [PTYPE] = 18, Reserved for CALLED PARTY RINGING of Trunked radio  
 [PTYPE] = 19, Reserved for MANUAL CALL DIVERSION of Trunked radio  
 [PTYPE] = 20, Reserved for INVALID REQUEST of Trunked radio  
 [PTYPE] = 21, Reserved for DATA ERROR of Trunked radio

[PTYPE] = 22, SELCALL RETRY  
 [PTYPE] = 23, RADIO STUNNED  
 [PTYPE] = 24, RADIO REVIVED  
 [PTYPE] = 25, FFSK DATA RECEIVED  
 [PTYPE] = 28, SELCALL AUTO-ACKNOWLEDGE  
     [PARA1] = 0, NOT RECEIVED  
     [PARA1] = 1, RECEIVED  
 [PTYPE] = 29, SDM AUTO-ACKNOWLEDGE  
     [PARA1] = 0, NOT RECEIVED  
     [PARA1] = 1, RECEIVED

Note that messages marked with A\*≡ will be filtered out by the Transparent mode message filter when the filter is activated and the CCDI is in Transparent mode.

#### Notes

1. Conventional radio only.  
The SELCALL ANSWERED (00) progress message indicates that a standard Selcall has been answered. This message will be sent when the call has been answered either by the CE or manually by the user.
2. Conventional radio only.  
The DEFERRED CALLING (01) progress message indicates that deferred calling is in progress. This message will be sent every three seconds while the RU is still waiting to make the deferred call.
3. Conventional radio and Trunked radio in conventional mode.  
The TX INHIBITED (02) progress message indicates that transmission has been inhibited. This message will be sent whenever transmission is requested but is inhibited.

4. Conventional radio only.  
The EMERGENCY MODE INITIATED (03) progress message indicates that the RU has been put into emergency mode. This message will be sent when the RU emergency mode switch is activated.
5. Conventional radio only.  
The EMERGENCY MODE TERMINATED (04) progress message indicates that the RU is no longer in emergency mode. This message will be sent when the RU receives a Areset to take it out of emergency mode.
6. Conventional radio only.  
The RECEIVER BUSY (05) progress message indicates that the receiver has detected RF signal on the current channel. This message will be sent when the current channel becomes busy. This message can be controlled by the Transparent mode message filter.
7. Conventional radio only.  
The RECEIVER NOT BUSY (06) progress message indicates that the receiver no longer detects RF signal on the current channel. This message will be sent when the current channel becomes not busy. This message can be controlled by the Transparent mode message filter.
8. Conventional radio and Trunked radio on traffic channel or in conventional mode.  
The PTT MIC ACTIVATED (07) progress message indicates that the PTT has been pressed. This message will be sent whenever the PTT is pressed in an attempt to transmit.
9. Conventional radio and Trunked radio on traffic channel or in conventional mode.  
The PTT MIC DEACTIVATED (08) progress message indicates that the PTT has been released. This message will be sent whenever the PTT is released after attempting to transmit.
10. Trunked radio only.  
The progress type numbers 09 to 21 are reserved for Trunked radio.
11. Conventional radio only.  
The SELCALL RETRY (22) progress message indicates that a standard Selcall call has been retried.
12. Conventional radio only.  
The RADIO STUNNED (23) progress message indicates that RU has been stunned.
13. Conventional radio only.  
The RADIO REVIVED (24) progress message indicates that RU has been revived.
14. Conventional radio only.  
The FFSK DATA RECEIVED (25) progress message indicates to CE that the RU has received a valid FFSK data in Command mode. The buffered FFSK data will be sent to the CE when Transparent mode is next invoked. Note that if FFSK data has received in Transparent mode, it will be sent directly to the CE without sending this progress message.
15. Conventional radio only.  
The SELCALL AUTO-ACKNOWLEDGE (28) progress message indicates whether an auto-acknowledge was received from the last Selcall call. 0 = no acknowledge received, 1 = acknowledge received. Note that this progress message will only be generated if the radio has been programmed to transmit Selcall auto-acknowledge.
16. Conventional radio only.  
The SDM AUTO-ACKNOWLEDGE (29) progress message indicates whether an auto-acknowledge was received from the last SDM call. 0 = no acknowledge received, 1 = acknowledge received. Note that this progress message will only be generated if the radio has been programmed to transmit SDM auto-acknowledges.

17. An example of a PROGRESS response message would be:

p0202CC This message indicates the progress message of TX INHIBITED.

#### 4.3.6 GET\_SDM

Solicited.

The GET\_SDM message is sent to the CE in response to a QUERY command. It sends the buffered SDM data the RU.

[IDENT] As≡

[PARAMETERS] [SDM\_DATA]

[SDM\_DATA] It can be maximum 32 character string but optional.

#### Notes

1. If there is any buffered SDM data in the RU, the SDM data will be sent to the CE. If there is no data available then the command is sent with no [PARAMETERS].
2. Examples of the GET\_SDM response message would be:

s002D This message indicates that the RU has no SDM data available.

s02Hi7A This message indicates that the RU has a valid SDM data AHi≡.