

### 8.10.3 Command Echo Message

A Command Echo Message is sent by an application that receives echo data, such as ground station equipment that collects data from the antenna (either looped back at the ground site or the spacecraft itself). This message is nominally sent after a Command Request is processed by the final destination (e.g. antenna or spacecraft). The Command Echo Message can also be generated without a prior Command Request Message being sent; this is known as an “unsolicited echo”, and can be generated by ground station equipment as a result of the antenna receiving noise or interference. The purpose of this message is to carry the actual command data that was received by the final destination, and supply it to the spacecraft operations center for comparison to the original command to ensure integrity of the command bits received at the destination.

**Table Error! No text of specified style in document.-1. Command Echo Message Summary**

<b>Sender</b>	A C2MS application that (may have) received the Command Request Message
<b>Senders Intended Usage</b>	Reply to the Command Request Message or send unsolicited
<b>Receiver</b>	Application that issued the Command Request Message, or an application collecting Command Echo Messages for audit trail purposes
<b>Receivers Intended Usage</b>	Subscribe
<b>What</b>	Provide success, failure, or interim status of the progress of the satellite command that was issued/requested
<b>When</b>	Upon receipt of the Command Request Message, or completion of this step of processing or unsolicited (see description)

#### Examples

1. Acknowledge receipt of the satellite command
2. Return status of this step in the sequence of sending a satellite command

### 8.10.3.1 Command Echo Message Subjects

Table Error! No text of specified style in document.-2. **Command Echo Message Subject Naming**

	Subject Standard	Domain Elements		Mission Elements			Message Elements		Miscellaneous Elements					
Subject Element	Specification	DOMAIN1	DOMAIN2	MISSION	CONST	SAT	TYP	SUBTYP	ME1	ME2	ME3	ME4	ME5	ME6
Subject Content	C2MS	[domain 1 – system specific]	[domain 2 – system specific]	[mission]	[constellation]	[sat]	MSG	CMDECHO	[Component: TLM3, TLM2...]	[Status]	[request id]			
Example for Publisher / Sender	C2MS	DOM1	DOM2	MSSN	CNS1	SAT1	MSG	CMDECHO	CMDOUT	1	3			
Example for Publisher / Sender	C2MS	DOM1	DOM2	MSSN	CNS1	SAT1	MSG	CMDECHO	CMDEXEC	4	5			
Example for Subscriber / Receiver	C2MS	DOM1	DOM2	MSSN	*	SAT1	MSG	CMDECHO	CMDEXEC	*	5			

**Table Error! No text of specified style in document.-3. Properties of the *Miscellaneous Elements* for the Command Echo Message**

<i>Miscellaneous Element</i>	Required / Optional	Description	Field Origination in Msg, if applicable
<i>ME1</i>	Required	Component name of Publisher	COMPONENT from header
<i>ME2</i>	Required	Status type supplied by Responder	CMD-ECHO-RESULT
<i>ME3</i>	Optional	ID associated with original request	REQUEST-ID

### Examples

Two components, CMDEXEC and CMDOUT, interact with the Command Echo message.

CMDOUT subject to send the Command Echo to CMDEXEC:

```
C2MS.DOM1.DOM2.MSSN.CNS1.SAT1.MSG.CMDECHO.CMDEXEC.GOOD
```

CMDEXEC subscribes to receive its own Command Echo Messages:

```
C2MS.*.*.*.*.*.MSG.CMDECHO.CMDEXEC.>
```

### 8.10.3.2 Command Echo Message Header

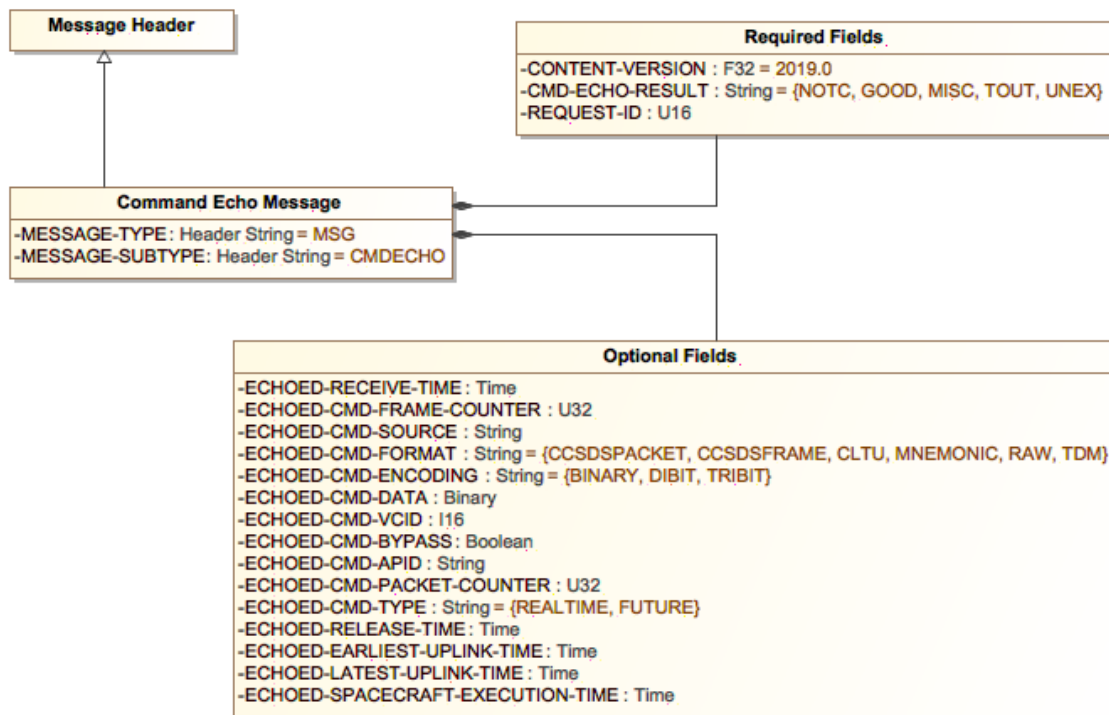
The abbreviated Table **Error! No text of specified style in document.-4** below shows the required values of the MESSAGE-TYPE and MESSAGE-SUBTYPE fields for the Command Echo Message header.

**Table Error! No text of specified style in document.-4. Command Echo Message Header**

Field Name	Value	Notes
HEADER-VERSION	2019	Version Number for this message description
MESSAGE-TYPE	MSG	Message type identifier: REQ, RESP, or MSG
MESSAGE-SUBTYPE	CMDECHO	Unique message identifier, fixed for C2MS Standard Messages
More ... Please refer to <b>Error! Reference source not found. Error! Reference source not found.</b> for a complete definition.	...	...

### 8.10.3.3 Command Echo Message Contents

**Error! Reference source not found.** below shows a UML object diagram of the Command Echo Message with its required and optional fields.



**Figure Error! No text of specified style in document.-1. Command Echo Message Diagram**

Table **Error! No text of specified style in document.-5** below describes additional field names, values, and notes for the Command Echo Message.

**Table Error! No text of specified style in document.-5. Command Echo Message Additional Information**

Field Name	Value	Notes
CONTENT-VERSION	2019	Version Number for this message content description
REQUEST-ID		This field's value is to be the same as the REQUEST-ID in the associated REQ message.
CMD-ECHO-RESULT	<b>Value</b>	<b>Description</b>
	NOTC	Not Compared
	GOOD	Good Compare
	MISC	Miscompare
	TOUT	Timed out waiting for echo
	UNEX	Unexpected echo received
		The Command Echo Result
ECHOED-RECEIVE-TIME		Time the echo was received or when the timeout occurred
ECHOED-CMD-FRAME-COUNTER		The echoed command counter; i.e., the command id
ECHOED-CMD-SOURCE		Which user/workposition/proc/schedule the message originated from
ECHOED-CMD-FORMAT	[CCSDSPACKET, CCSDSFRAME, CLTU, MNEMONIC, RAW, TDM]	Type of command
ECHOED-CMD-ENCODING	[BINARY, DIBIT, TRIBIT]	Type of command encoding; required if ECHOED-CMD-DATA is present
ECHOED-CMD-DATA		Received command echo data used to compare with uplinked CMD-DATA
ECHOED-CMD-VCID		CCSDS Virtual Channel ID
ECHOED-CMD-BYPASS		CCSDS COP-1 flag for "Bypass of Acceptance Check", i.e., without verification
ECHOED-CMD-APID		Application Process Identifier
ECHOED-CMD-PACKET-COUNTER		
ECHOED-CMD-TYPE	[REALTIME, FUTURE]	If REALTIME, execute upon receipt; if FUTURE, execute at ECHOED-SPACECRAFT-EXECUTION-TIME

Field Name	Value	Notes
ECHOED-RELEASE-TIME		Time the command should begin being released from the front end processor to the remote tracking station
ECHOED-EARLIEST-UPLINK-TIME		Absolute or relative time can apply
ECHOED-LATEST-UPLINK-TIME		Absolute or relative time can apply
ECHOED-SPACECRAFT-EXECUTION-TIME		Required if ECHOED-CMD-TYPE="FUTURE"; absolute or relative time can apply