



DIGITAL FORENSIC RESEARCH CONFERENCE

Android Auto & Google Assistant

By

Joshua Hickman

From the proceedings of

The Digital Forensic Research Conference

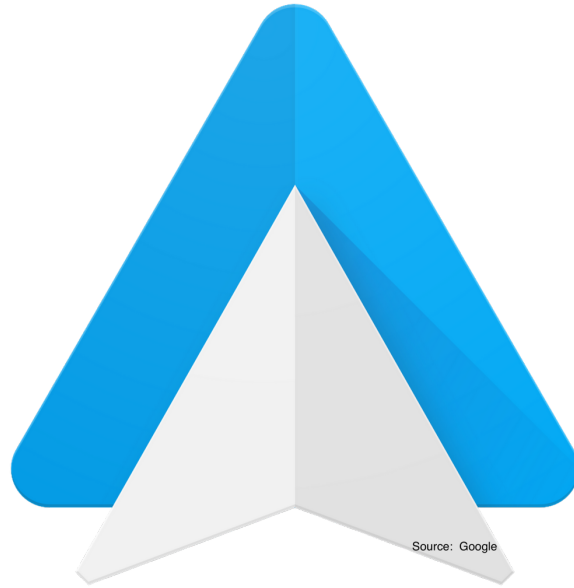
DFRWS 2019 USA

Portland, OR (July 15th - 19th)

DFRWS is dedicated to the sharing of knowledge and ideas about digital forensics research. Ever since it organized the first open workshop devoted to digital forensics in 2001, DFRWS continues to bring academics and practitioners together in an informal environment. As a non-profit, volunteer organization, DFRWS sponsors technical working groups, annual conferences and challenges to help drive the direction of research and development.

<https://dfrws.org>

Android Auto & Google Assistant



How Google Encourages Hands-Free Motoring

What is Android Auto?



What is Android Auto?

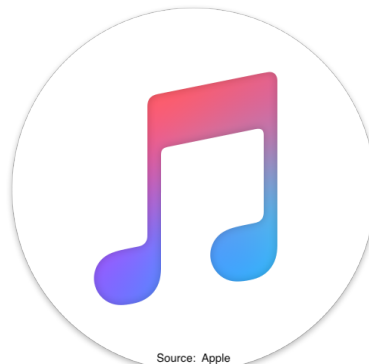
Android Auto is the method by which android projects certain application services on to a vehicle infotainment/telematics display unit

com.google.android.printservice.recommendation	recommendation
com.google.android.projection.gearhead	gearhead
com.google.android.setupwizard	setupwizard
com.google.android.storagemanager	storagemanager

\DATA\DATA\COM.ANDROID.PROJECTION.GEARHEAD

What is Android Auto?

Android Auto is the method by which android projects certain application services on to a vehicle infotainment/telematics display unit



Who Supports Android Auto?

Compatible Vehicles





Mahindra



TATA MOTORS



Source: Google

Compatible stereos



ADAYO

ALPINE

BLAUPUNKT

CASKA

Clarion

CVTE

EVS



JVC

KENWOOD



MAUTO

MONGOOSE
Automotive Technologies

Panasonic

Pioneer

SKYPINE

SONY

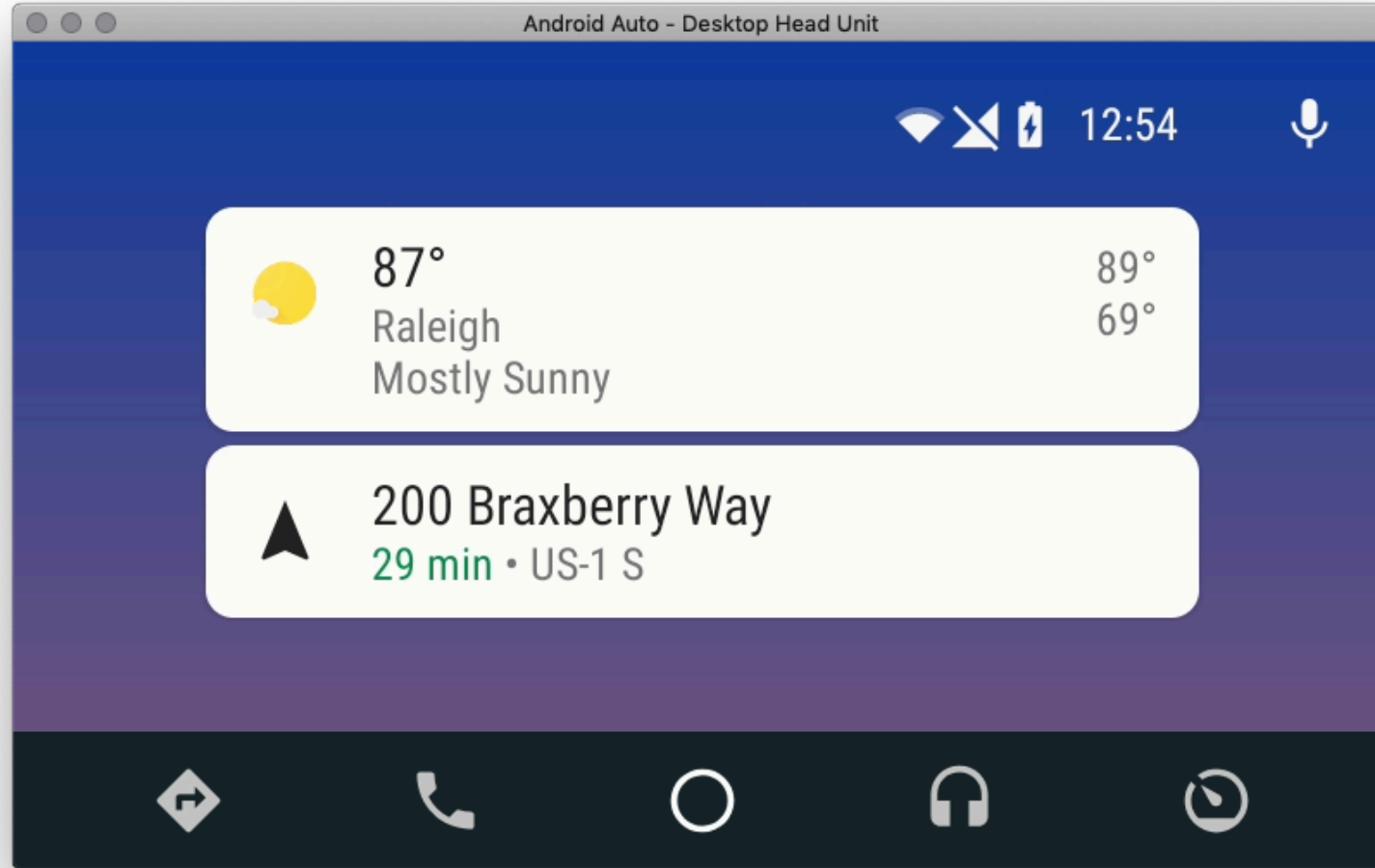
UniMax

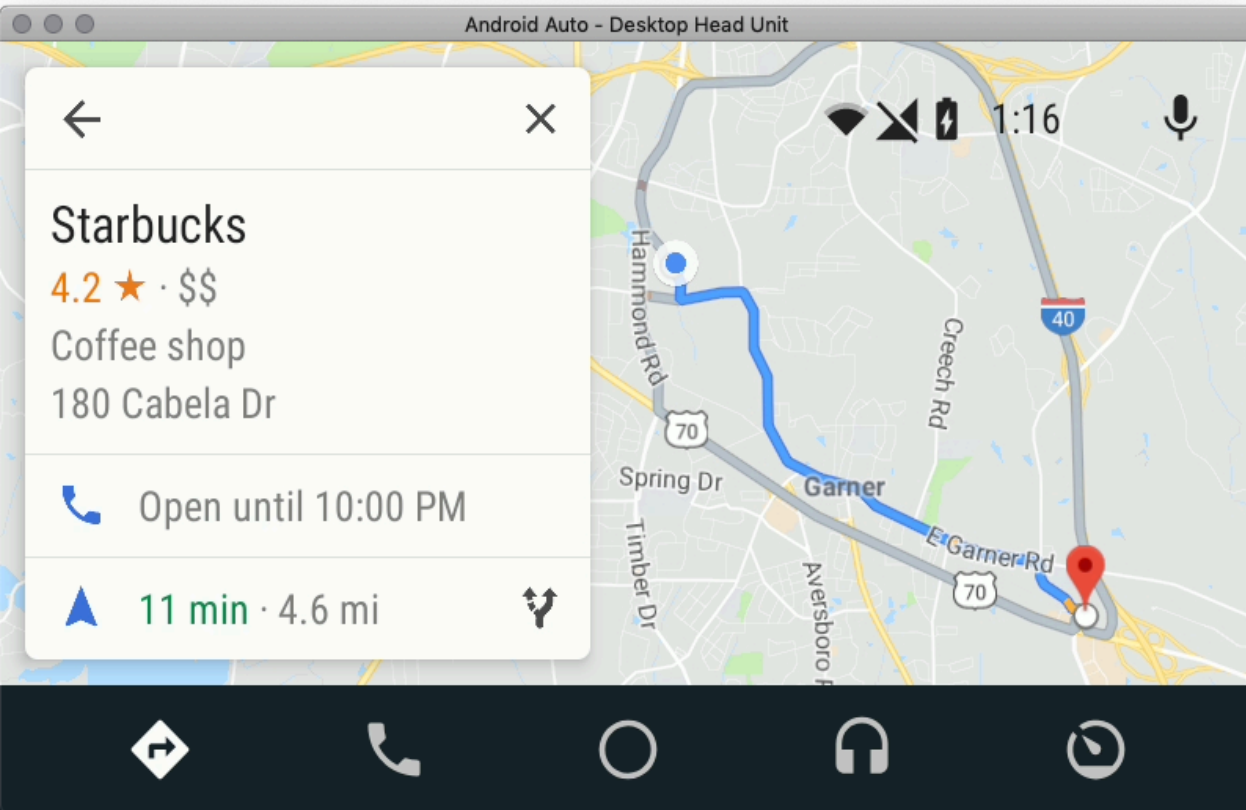
Source: Google

Source: Google

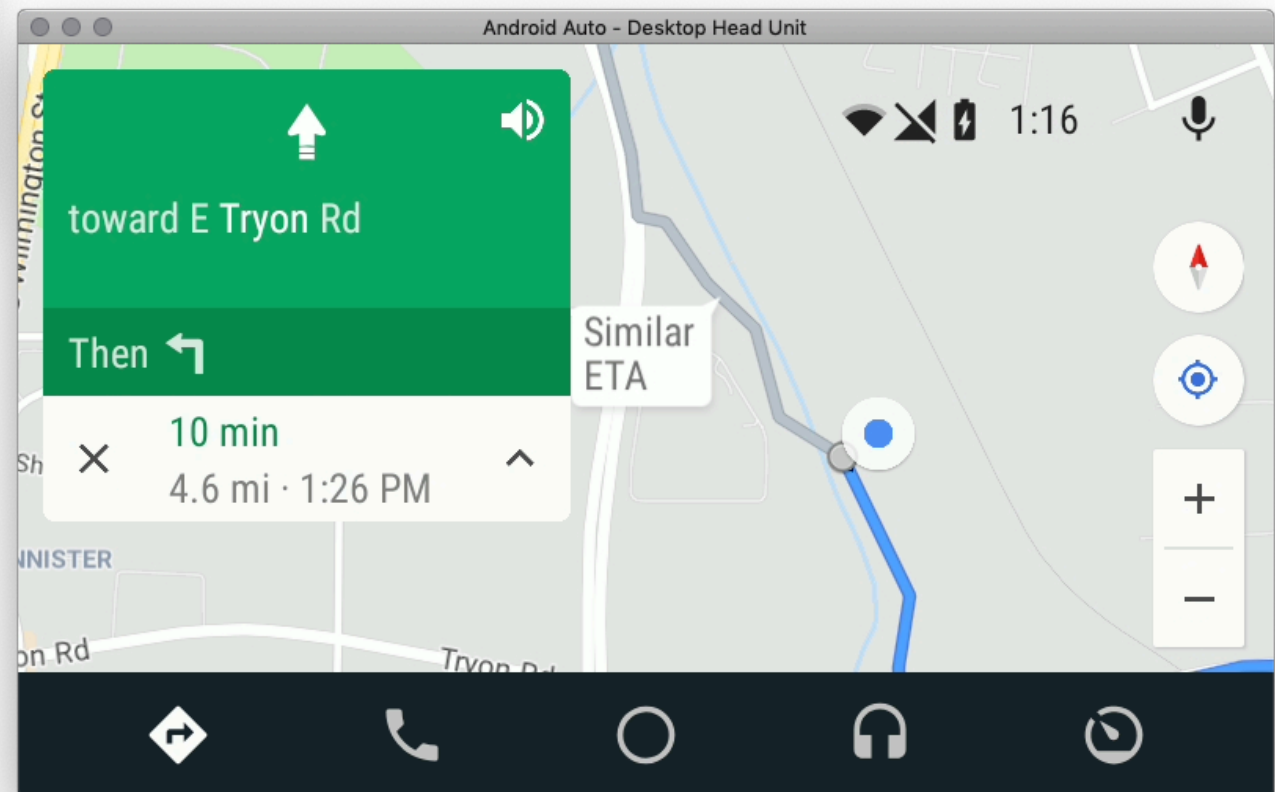
Vehicle inspection

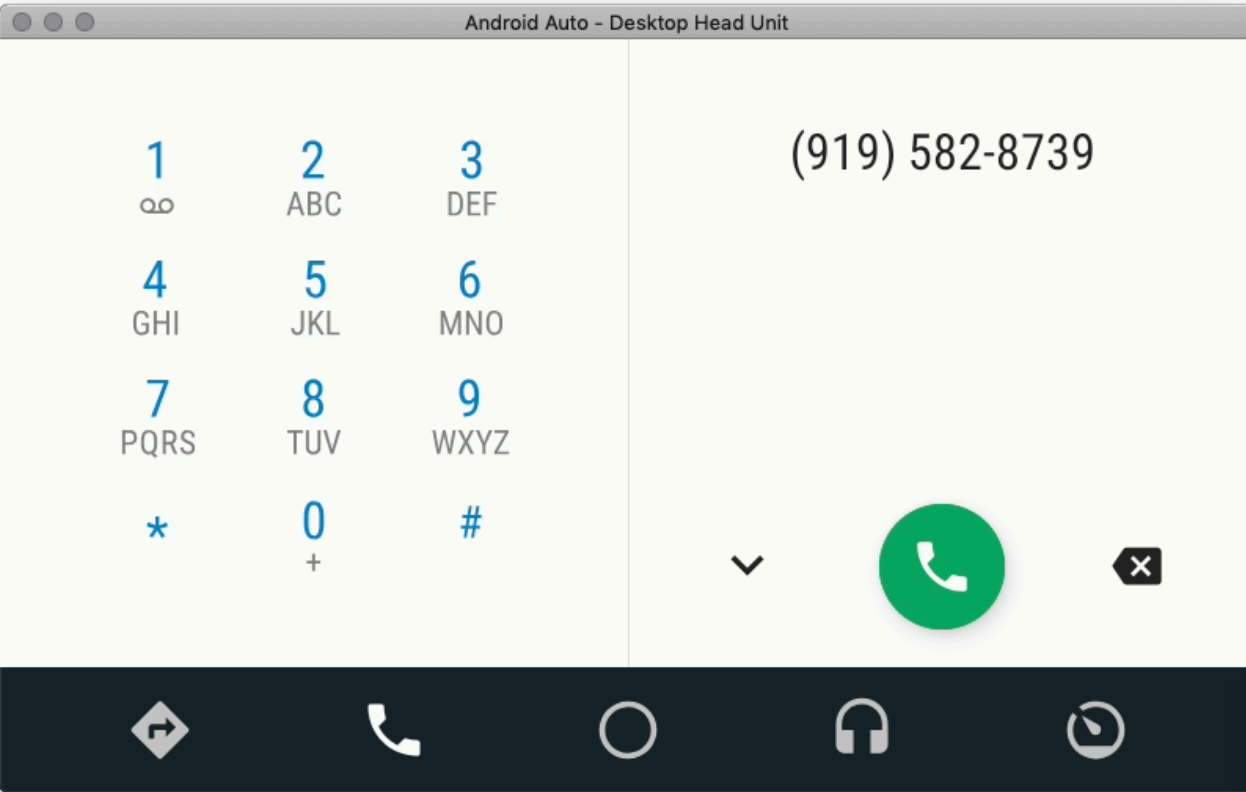
Android Auto Home screen



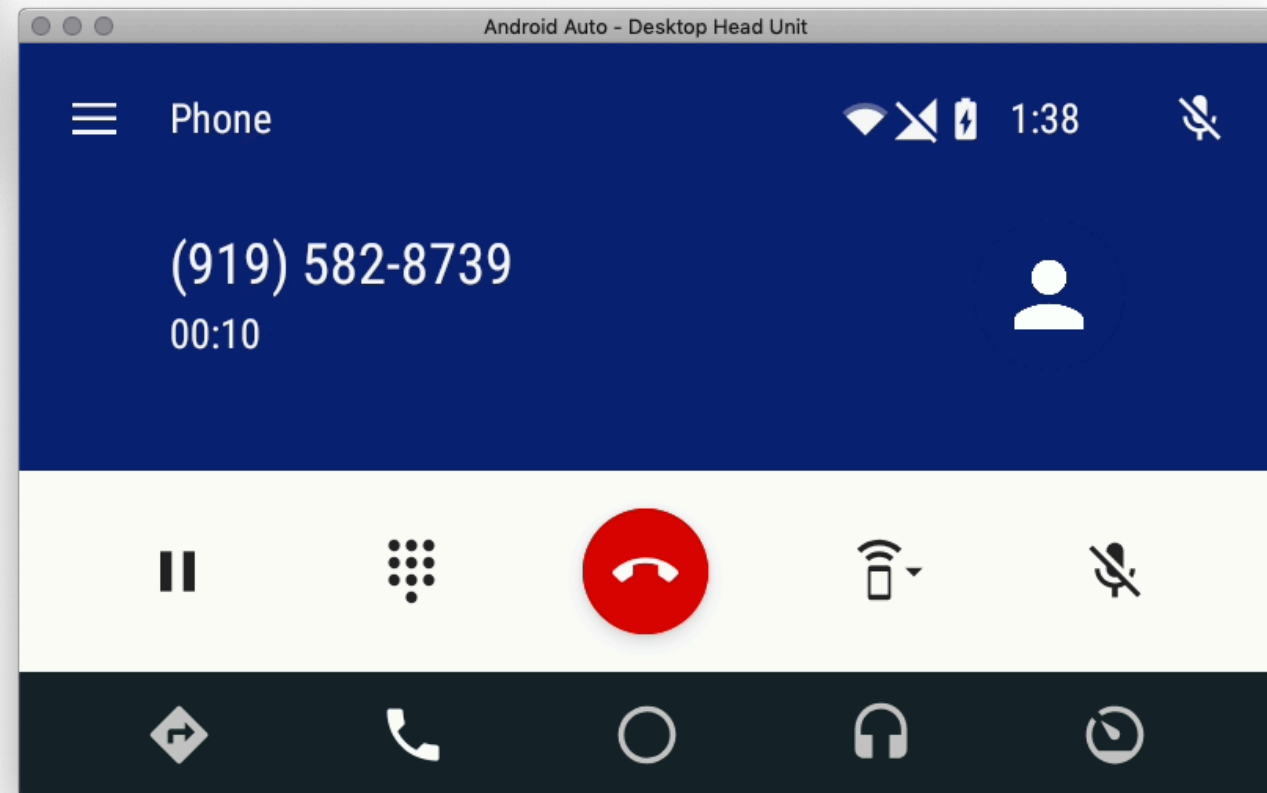


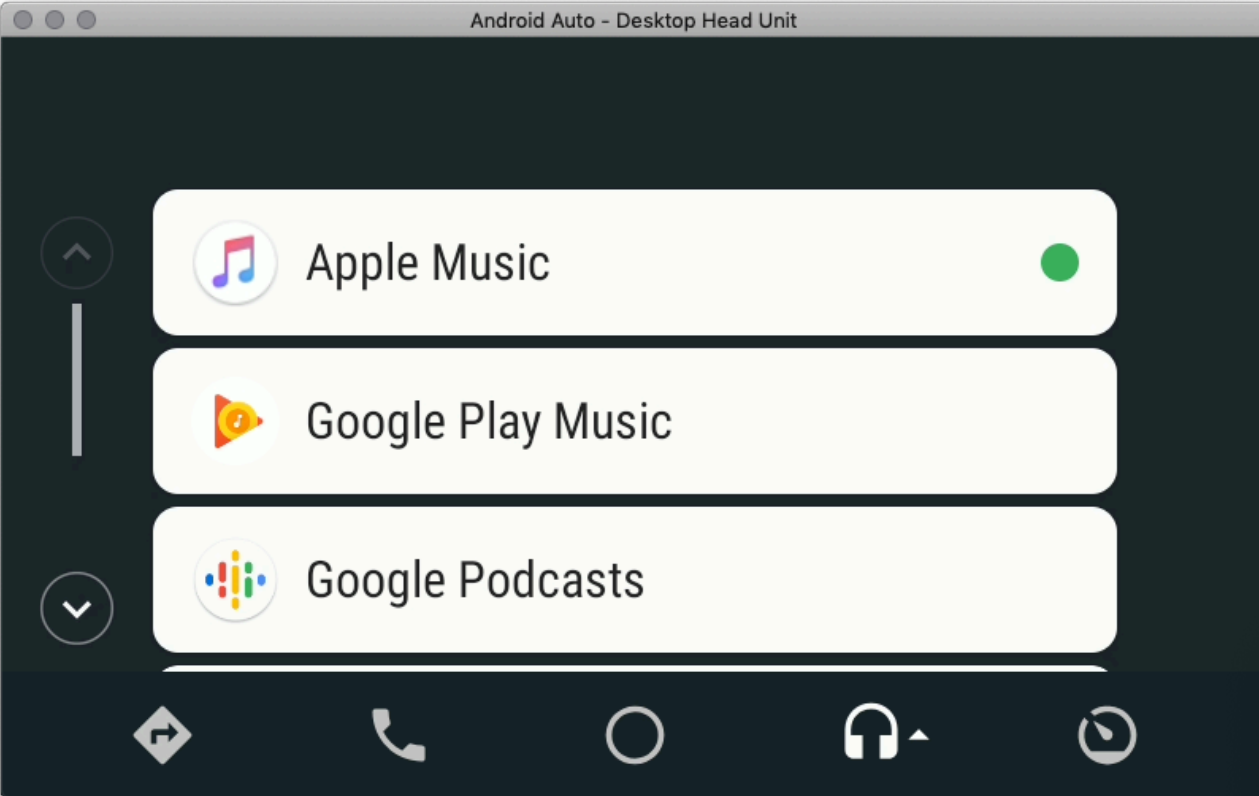
Navigation



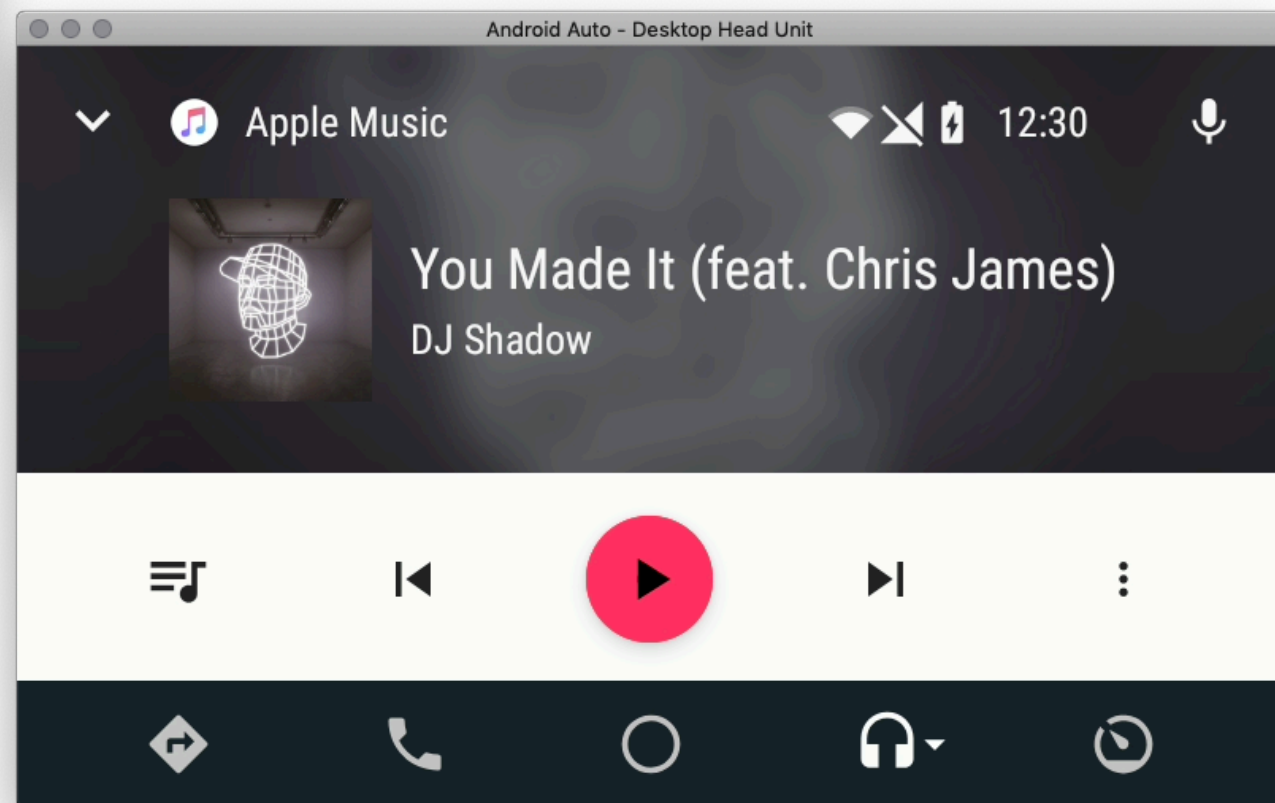


Phone

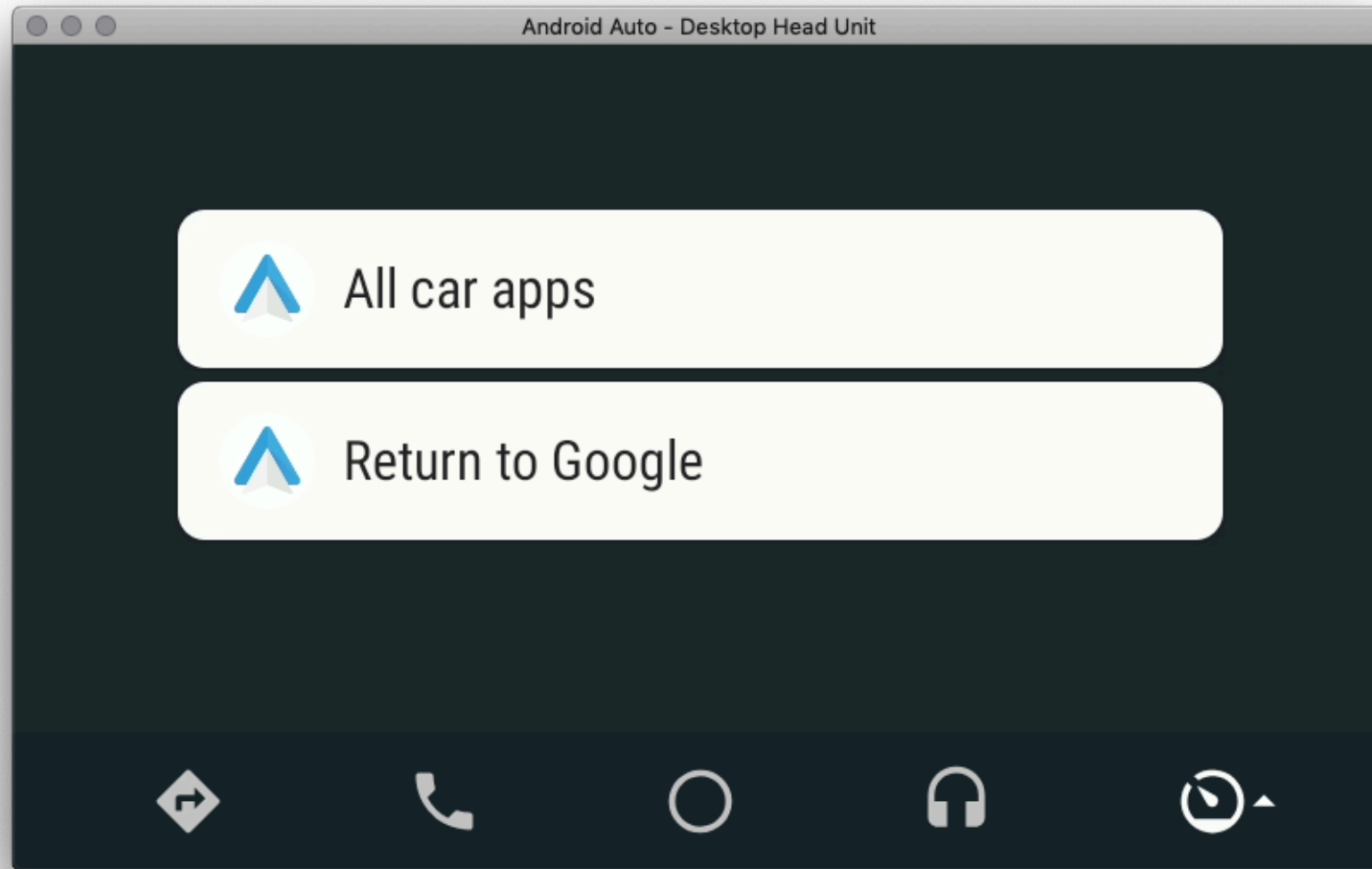




Audio playback



Emergency exit



Tire Tracks

What Is Left Behind?

- Apps that are used via Android Auto keep their respective user-generated data to themselves – Data is Siloed
- There is some data specific to Android Auto Usage that is left behind in Android Auto's directory

What Is Left Behind? – Oreo & Pie

- Time of Last run
- Bluetooth MAC address of paired vehicle
- Name of paired vehicle (Bluetooth Name)
- Location of last disconnect
- Time of last disconnect
- app_state__shared_preferences.xml
- common_user_settings.xml
- location_manager.xml
- location_manager.xml
- location_manager.xml

What Is Left Behind? – Pie Only

- Screen setting (Off or Always On)
 - Auto Reply Message (What it is)
 - Message Notification (on or off)
- `common_user_settings.xml`

app_state__shared_preferences.xml

Time of Last run

```
<?xml version="1.0" encoding="UTF-8" standalone="true"?>
- <map>
  <boolean value="true" name="pref_projected_activation"/>
  <long value="1548616472427" name="pref_lastrun"/>
  <boolean value="true" name="pref_assistant_promo_seenPROJECTED"/>
  <boolean value="true" name="pref_android_auto_activation"/>
</map>
```

Oreo

```
<?xml version="1.0" encoding="UTF-8" standalone="true"?>
- <map>
  <boolean value="true" name="pref_projected_activation"/>
  <long value="1554464079571" name="pref_lastrun"/>
  <boolean value="true" name="pref_assistant_promo_seenPROJECTED"/>
  <boolean value="true" name="pref_assistant_promo_seenVANAGON"/>
  <boolean value="true" name="pref_android_auto_activation"/>
  <boolean value="true" name="pref_vanagon_activation"/>
</map>
```

Pie

common_user_settings.xml

Bluetooth MAC address of paired vehicle

```
<?xml version="1.0" encoding="UTF-8" standalone="true"?>
- <map>
  - <set name="AndroidAutoBluetooth">
    <string>B4:EC:02:73:FF:93</string>
  </set>
</map>
```

OREO

```
<?xml version="1.0" encoding="UTF-8" standalone="true"?>
- <map>
  <boolean value="false" name="key_settings_messaging_visual_preview_enabled"/>
  <boolean value="true" name="key_settings_wireless_projection_enable"/>
  <string name="key_settings_carmode_screen_on">SCREEN_ON_POLICY_ALWAYS_ON</string>
  <boolean value="false" name="key_settings_messaging_visual_preview_with_visibility_control_enabled"/>
  <boolean value="true" name="key_settings_messaging_notifications_enabled"/>
  <boolean value="false" name="key_settings_carmode_turn_off_wifi"/>
  - <set name="AndroidAutoBluetooth">
    <string>B4:EC:02:73:FF:93</string>
  </set>
  <boolean value="false" name="key_settings_carmode_turn_on_bluetooth"/>
  <boolean value="true" name="key_settings_telemetry_enable"/>
  <string name="key_settings_notifications_auto_reply_message">I'm driving right now</string>
</map>
```

Pie

Location_manager.xml

Name of car, Location at time of last Disconnect, & Time of last Disconnect

```
<?xml version="1.0" encoding="UTF-8" standalone="true"?>
- <map>
  <string name="car_name">Nissan</string>
  <string name="latitude">34.99277</string>
  <string name="delay_ms">971</string>
  <string name="accuracy">3.0</string>
  <string name="time">1548620033971</string>
  <string name="speed">0.0</string>
  <string name="longitude">-78.13563</string>
</map>
```

OREO

```
<?xml version="1.0" encoding="ISO-8859-1"?>
- <map>
  <string name="car_name">Nissan</string>
  <string name="latitude">35.73556</string>
  <string name="delay_ms">-1015</string>
  <string name="accuracy">3.0</string>
  <string name="time">1554466644985</string>
  <string name="speed">0.0</string>
  <string name="longitude">-78.63627</string>
</map>
```

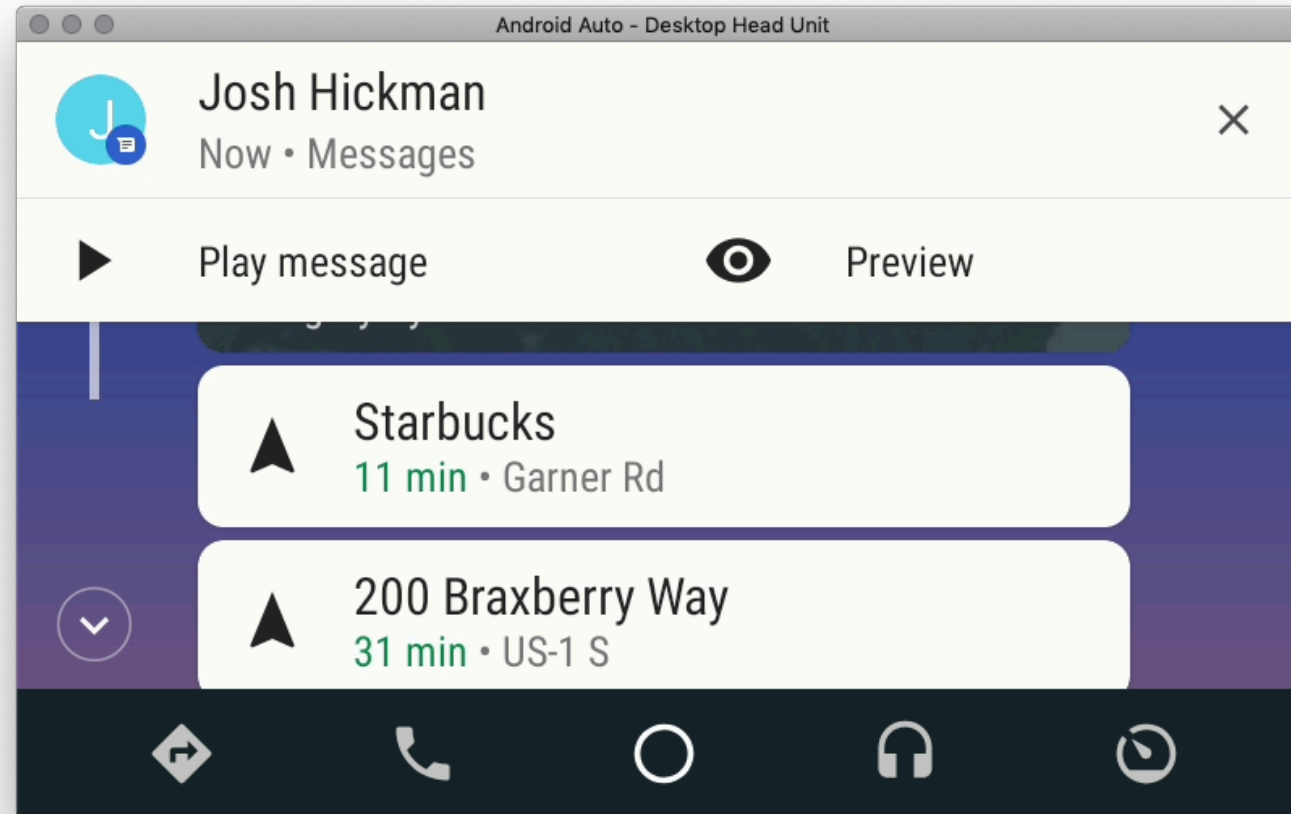
Pie

Pie Only – Common_user_settings.xml

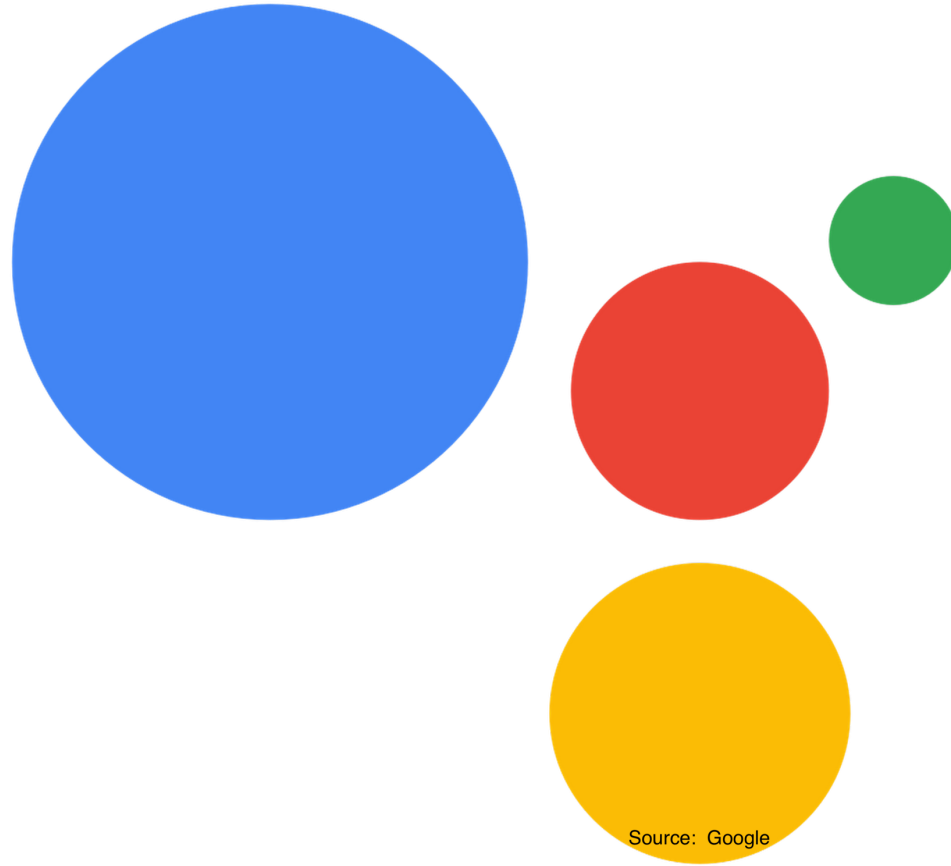
Screen Setting, Message Notification, & Auto Reply Message

```
<?xml version="1.0" encoding="UTF-8" standalone="true"?>
- <map>
  <boolean value="false" name="key_settings_messaging_visual_preview_enabled"/>
  <boolean value="true" name="key_settings_wireless_projection_enable"/>
  <string name="key_settings_carmode_screen_on">SCREEN_ON_POLICY_ALWAYS_ON</string>
  <boolean value="false" name="key_settings_messaging_visual_preview_with_visibility_control_enabled"/>
  <boolean value="true" name="key_settings_messaging_notifications_enabled"/>
  <boolean value="false" name="key_settings_carmode_turn_off_wifi"/>
  - <set name="AndroidAutoBluetooth">
    <string>B4:EC:02:73:FF:93</string>
  </set>
  <boolean value="false" name="key_settings_carmode_turn_on_bluetooth"/>
  <boolean value="true" name="key_settings_telemetry_enable"/>
  <string name="key_settings_notifications_auto_reply_message">I'm driving right now</string>
</map>
```

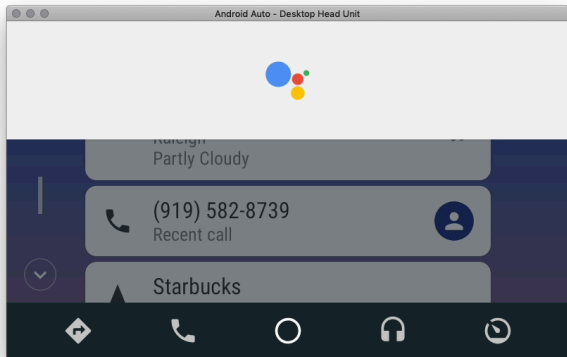
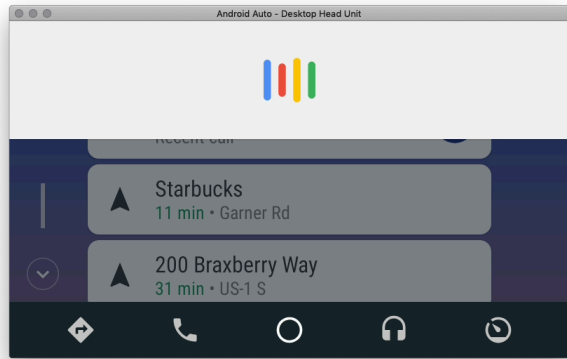
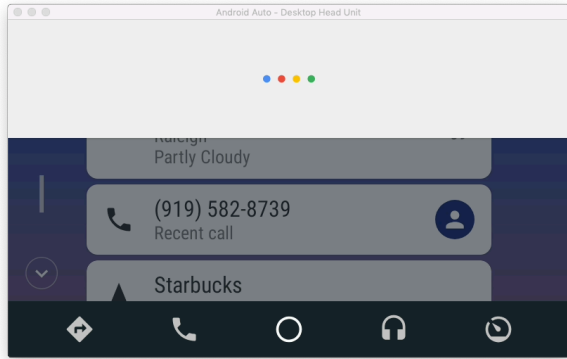
This can be distracting!



Google Assistant & Hands Free Motoring



Source: Google



An Assistant That Can Assist

- Summon & Listen
- Accept Input & take action on a user's behalf
- Provide Feedback

Google Assistant interaction data

- Google Assistant interaction data is stored on-device in binary protocol buffer (protobuf) files
- Protobuf files can be generated due to :
 - Google Assistant Usage via Android Auto
 - Google Assistant usage outside of Android Auto (e.g., Ok, Google!)
- The data is unstructured, so automated decoding/parsing is not possible at this time*
- The data contains the text of the vocal input along with timestamps

Where Is Google Assistant Interaction data?









Google Quick Search Box!

com.google.android.GoogleCamera	GoogleCamera
com.google.android.googlequicksearchbox	googlequicksearchbox
com.google.android.gsf	gsf



















\DATA\DATA\COM.ANDROID.GOOGLEQUICKSEARCHBOX

App_Session Folder

Protobuf file list

Name ^	Date modified	Type	Size
 00000000290354543320.binarypb	6/18/2019 3:39 PM	BINARYPB File	17 KB
 00000000359074311786.binarypb	6/18/2019 3:39 PM	BINARYPB File	5 KB
 00000000359074312067.binarypb	6/18/2019 3:39 PM	BINARYPB File	25 KB
 00000000359074312800.binarypb	6/18/2019 3:39 PM	BINARYPB File	9 KB
 000000001321156222687.binarypb	6/18/2019 3:39 PM	BINARYPB File	102 KB
 000000001664754413099.binarypb	6/18/2019 3:39 PM	BINARYPB File	34 KB
 000000001664754413128.binarypb	6/18/2019 3:39 PM	BINARYPB File	8 KB
 00129770309495226719.binarypb	6/18/2019 3:39 PM	BINARYPB File	11 KB

OREO

Name ^	Date modified	Type	Size
 00000000633976751319.binarypb	2/14/2019 8:19 AM	BINARYPB File	33 KB
 00000000633976751700.binarypb	2/14/2019 10:59 AM	BINARYPB File	286 KB
 00000000633976751703.binarypb	2/14/2019 10:59 AM	BINARYPB File	165 KB
 00000000702696384764.binarypb	2/14/2019 11:29 AM	BINARYPB File	461 KB
 00000000771416267564.binarypb	2/15/2019 7:12 AM	BINARYPB File	29 KB
 00000000840138671334.binarypb	2/18/2019 8:20 AM	BINARYPB File	29 KB
 00000000840138974229.binarypb	2/19/2019 8:15 AM	BINARYPB File	33 KB
 00000000908860321415.binarypb	2/21/2019 8:11 AM	BINARYPB File	30 KB
 000000001046304860251.binarypb	3/4/2019 3:45 PM	BINARYPB File	9 KB
 000000001115029147952.binarypb	3/5/2019 8:07 AM	BINARYPB File	32 KB
 000000001321209787652.binarypb	3/30/2019 3:10 PM	BINARYPB File	12 KB
 000000001389932905489.binarypb	4/3/2019 8:19 PM	BINARYPB File	13 KB
 000000001527371868886.binarypb	4/4/2019 8:19 AM	BINARYPB File	3 KB
 000000001527371869005.binarypb	4/4/2019 11:24 AM	BINARYPB File	10 KB
 000000001527371869032.binarypb	4/4/2019 11:24 AM	BINARYPB File	13 KB
 000000001596091893819.binarypb	4/4/2019 8:51 PM	BINARYPB File	13 KB
 000000001596091894381.binarypb	4/5/2019 8:17 AM	BINARYPB File	221 KB
 000000001596091894908.binarypb	4/5/2019 12:04 PM	BINARYPB File	8 KB

Pie

Android Auto BinaryPB File head

Offset	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	ANSI ASCII
0	09	D8	BA	7A	9A	43	00	00	00	15	59	51	EF	11	1A	0D	°zšC YQİ
16	63	61	72	5F	61	73	73	69	73	74	61	6E	74	DA	B5	BB	car_assistantµ»
32	F8	03	00	8A	84	C6	F8	03	16	0A	04	00	00	00	00	15	Š „Æø
48	00	00	00	00	18	00	21	3A	5B	21	00	00	00	00	00	E2	!:(! â
64	D4	C8	F8	03	D8	52	0A	E0	48	FF	F3	44	C4	00	10	F9	ÔÈø ØR à«ÿóDÄ ù
80	62	18	00	D0	44	94	17	FE	79	2B	05	8B	96	A9	62	BA	b ðD" þy+ <-@b°
96	4D	95	E2	90	B9	12	0A	F2	FA	98	B5	95	CD	FC	90	F8	M•â ¸ òúp•Íü ø
112	D8	26	FC	A7	E4	66	3A	51	90	28	B3	A6	79	15	F3	FF	Ø&üsäf:Q (°!y óÿ
128	AB	84	10	72	0E	39	0B	18	3E	51	C9	AB	FF	D0	95	BE	«„ r 9 >QÉ«ÿð•¼
144	11	3E	A7	79	F2	85	DF	F7	7F	26	1F	23	18	D8	0B	1A	>Syò...B÷ & # Ø

OREO

car_assistant

- PROTOBUF FILES REVEAL THEIR ORIGIN
- SOME HAVE EMBEDDED AUDIO DATA (YODA = MP3)

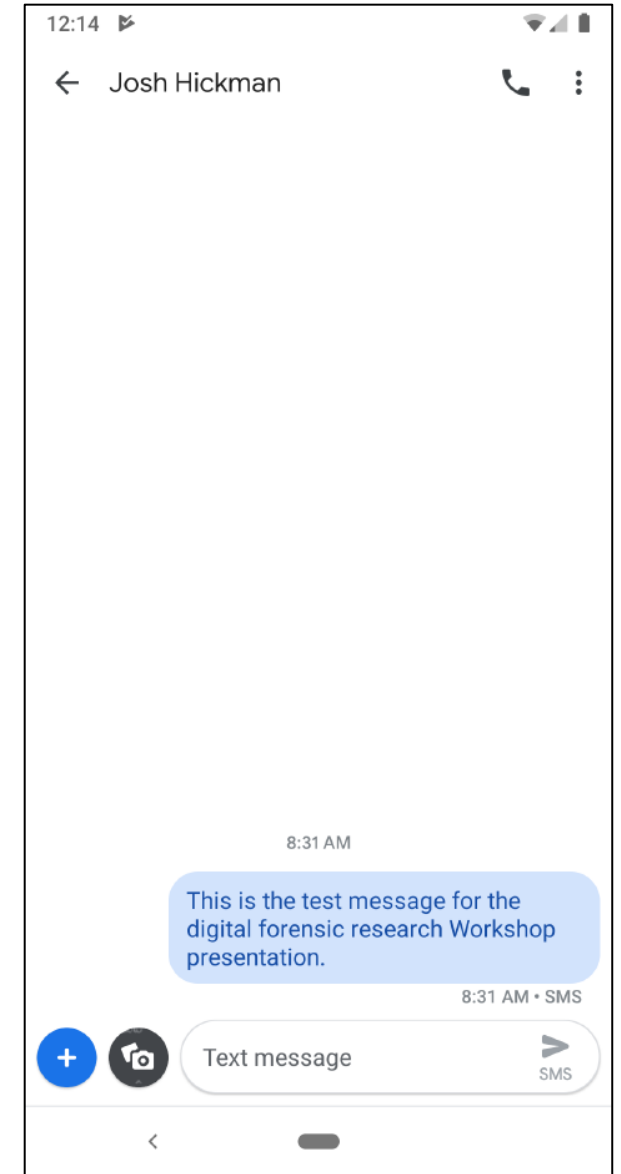
Offset	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	ANSI ASCII
0	09	2C	1B	FE	9B	B3	00	00	00	15	A9	79	EF	11	1A	0D	, þ>³ @yİ
16	63	61	72	5F	61	73	73	69	73	74	61	6E	74	DA	B5	BB	car_assistantµ»
32	F8	03	00	8A	84	C6	F8	03	16	0A	04	00	00	00	00	15	ø Š„Æø
48	00	00	00	00	18	00	21	71	EA	F4	02	00	00	00	00	E2	!qêô â
64	D4	C8	F8	03	D5	B5	01	0A	E0	AB	01	FF	F3	44	C4	00	ÔÈø Ōµ à«ÿóDÄ
80	11	B8	75	C4	00	C3	CC	48	70	10	6C	54	41	05	1E	B8	,uÄ ÄİHp lTA ,
96	29	80	50	A3	A3	39	29	0E	B3	90	DF	3B	90	94	BA	81)€P££9) ¸ B; °
112	8C	0C	E1	A1	60	80	64	86	8F	26	61	33	8F	59	00	70	Œ á;`ēdt &a3 Y p
128	58	C8	58	36	09	8A	9B	C5	8C	81	3F	99	35	53	4C	1A	XÈX6 Š>ÄŒ ?™SSL
144	34	7F	FF	F4	FE	A0	D9	83	4A	16	0D	9A	1C	2D	30	03	4 ŷôþ ŬfJ š -0

Pie





Pre-coffee Josh



From the Bugle database

18	267	153	??	NULL
19	269	155	This is the test message for the digital forensic research Workshop presentation.	NULL
20	271	156		content://mms

18		text/plain	NULL	-1	-1	1560859667547	NULL
19		text/plain	NULL	-1	-1	1560947517683	NULL
20	/mms/part/242	image/png	content://media/ext...	1080	2160	1560960892000	NULL

DCode v4.02a (Build: 9306)

DCode
Convert Data to Date / Time Values

Add Bias: UTC -04:00 ☐ Window on top

Decode Format: Unix: Numeric Value

Example: 1170245478

Value to Decode: 1560947517683

Date & Time: **Wed, 19 June 2019 08:31:57 -0400**

www.digital-detective.co.uk

Android Auto BinaryPB File head

car_assistant

Offset	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	ANSI ASCII
0	09	90	46	65	A2	53	03	00	00	15	57	44	F0	11	1A	0D	FeS WD
16	63	61	72	5F	61	73	73	69	73	74	61	6E	74	DA	B5	BB	car assistantju»
32	F8	03	00	8A	84	C6	F8	03	F3	01	0A	E0	01	D8	00	00	ø Š„Æø ó à Ø
48	00	42	4E	44	4C	01	00	00	00	2F	00	00	00	63	00	6F	BNDL / c o
64	00	6D	00	2E	00	67	00	6F	00	6F	00	67	00	6C	00	65	m . g o o g l e
80	00	2E	00	61	00	6E	00	64	00	72	00	6F	00	69	00	64	. a n d r o i d
96	00	2E	00	61	00	70	00	70	00	73	00	2E	00	67	00	73	. a p p s . g s
112	00	61	00	2E	00	73	00	65	00	61	00	72	00	63	00	68	a . s e a r c h
128	00	2E	00	63	00	6F	00	72	00	65	00	2E	00	61	00	6E	. c o r e . a n
144	00	2E	00	61	00	2E	00	61	00	73	00	00	00	03	00	00	. a . a s
160	00	64	00	00	00	42	4E	44	4C	01	00	00	00	29	00	00	d BNDL)
176	00	49	00	43	00	49	00	4E	00	47	00	5F	00	43	00	4F	I C I N G _ C O
192	00	4E	00	4E	00	45	00	43	00	54	00	49	00	4F	00	4E	N N E C T I O N
208	00	5F	00	49	00	4E	00	49	00	54	00	49	00	41	00	4C	_ I N I T I A L
224	00	49	00	5A	00	41	00	54	00	49	00	4F	00	4E	00	5F	I Z A T I O N _
240	00	54	00	49	00	4D	00	45	00	5F	00	4D	00	53	00	45	T I M E _ M S E
256	00	43	00	00	00	01	00	00	00	08	00	00	00	15	00	00	C
272	00	00	18	00	21	5D	D0	03	00	00	00	00	00	E2	D4	C8	!jÐ ãÔÈ
288	F8	03	F5	24	0A	BC	14	4F	67	67	53	00	02	00	00	00	ø ô\$ ¼ OggS
304	00	00	00	00	00	00	00	00	00	00	00	00	00	43	5E	C1	c^Á
320	A1	01	13	4F	70	75	73	48	65	61	64	01	01	38	01	C0	; OpusHead 8 À
336	5D	00	00	00	00	00	4F	67	67	53	00	00	00	00	00	00] OggS
352	00	00	00	00	00	00	00	00	01	00	00	00	4A	C2	38	F2	JÂ8ò
368	01	2B	4F	70	75	73	54	61	67	73	1B	00	00	00	47	6F	+OpusTags Go
384	6F	67	6C	65	20	53	70	65	65	63	68	20	75	73	69	6E	ogle Speech usin
400	67	20	6C	69	62	6F	70	75	73	00	00	00	00	4F	67	67	g libopus Ogg
416	53	00	04	88	74	00	00	00	00	00	00	00	00	00	00	02	S ^t
432	00	00	00	4F	8D	65	01	1F	7C	76	51	51	51	51	51	51	O e vQQQQQQ
448	51	50	4D	4B	4B	4C	4B	48	45	43	40	51	5E	54	41	51	QPMKKLKHEC@Q^TAQ

Pie...?

2928	D4 0E 01 4C 60 40 80 04 02 00 00	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ô L'ge
2944	00 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00		
2960	00 00 04 00 00 00 51 00 00 00 74 00 68 00 69 00		Q thi
2976	73 00 20 00 69 00 73 00 20 00 74 00 68 00 65 00		s is the
2992	20 00 74 00 65 00 78 00 74 00 20 00 6D 00 65 00		text me
3008	73 00 73 00 61 00 67 00 65 00 20 00 66 00 6F 00		ssage fo
3024	72 00 20 00 74 00 68 00 65 00 20 00 64 00 69 00		r the di
3040	67 00 69 00 74 00 61 00 6C 00 20 00 66 00 6F 00		gital fo
3056	72 00 65 00 6E 00 73 00 69 00 63 00 20 00 72 00		rensic r
3072	65 00 73 00 65 00 61 00 72 00 63 00 68 00 20 00		esearch
3088	57 00 6F 00 72 00 6B 00 73 00 68 00 6F 00 70 00		Workshop
3104	20 00 70 00 72 00 65 00 73 00 65 00 6E 00 74 00		present
3120	61 00 74 00 69 00 6F 00 6E 00 2E 00 00 00 52 00		ation. R
3136	00 00 74 00 68 00 69 00 73 00 20 00 69 00 73 00		this is
3152	20 00 74 00 68 00 65 00 20 00 74 00 65 00 73 00		the tes
3168	74 00 20 00 6D 00 65 00 73 00 73 00 61 00 67 00		t messag
3184	65 00 20 00 66 00 6F 00 72 00 20 00 74 00 68 00		e for th
3200	65 00 79 00 20 00 64 00 69 00 67 00 69 00 74 00		ey digit
3216	61 00 6C 00 20 00 66 00 6F 00 72 00 65 00 6E 00		al foren
3232	73 00 69 00 63 00 20 00 72 00 65 00 73 00 65 00		sic rese
3248	61 00 72 00 63 00 68 00 20 00 57 00 6F 00 72 00		arch Wor
3264	6B 00 73 00 68 00 6F 00 70 00 20 00 70 00 72 00		kshop pr
3280	65 00 73 00 65 00 6E 00 74 00 61 00 74 00 69 00		esentati
3296	6F 00 6E 00 2E 00 00 00 00 00 4F 00 00 00 74 00		on. Ot
3312	68 00 69 00 73 00 20 00 69 00 73 00 20 00 74 00		his is t
3328	68 00 65 00 20 00 74 00 65 00 73 00 74 00 20 00		he test
3344	6D 00 65 00 73 00 73 00 61 00 67 00 65 00 20 00		message
3360	34 00 20 00 74 00 68 00 65 00 20 00 64 00 69 00		4 the di
3376	67 00 69 00 74 00 61 00 6C 00 20 00 66 00 6F 00		gital fo
3392	72 00 65 00 6E 00 73 00 69 00 63 00 20 00 72 00		rensic r
3408	65 00 73 00 65 00 61 00 72 00 63 00 68 00 20 00		esearch
3424	57 00 6F 00 72 00 6B 00 73 00 68 00 6F 00 70 00		Workshop
3440	20 00 70 00 72 00 65 00 73 00 65 00 6E 00 74 00		present
3456	61 00 74 00 69 00 6F 00 6E 00 2E 00 00 00 52 00		ation. R
3472	00 00 74 00 68 00 69 00 73 00 20 00 69 00 73 00		this is
3488	20 00 74 00 68 00 65 00 20 00 74 00 65 00 73 00		the tes
3504	74 00 73 00 20 00 6D 00 65 00 73 00 73 00 61 00		ts messa
3520	67 00 65 00 20 00 66 00 6F 00 72 00 20 00 74 00		ge for t
3536	68 00 65 00 20 00 64 00 69 00 67 00 69 00 74 00		he digit
3552	61 00 6C 00 20 00 66 00 6F 00 72 00 65 00 6E 00		al foren
3568	73 00 69 00 63 00 20 00 72 00 65 00 73 00 65 00		sic rese
3584	61 00 72 00 63 00 68 00 20 00 57 00 6F 00 72 00		arch Wor
3600	6B 00 73 00 68 00 6F 00 70 00 20 00 70 00 72 00		kshop pr
3616	65 00 73 00 65 00 6E 00 74 00 61 00 74 00 69 00		esentati
3632	6F 00 6E 00 2E 00 00 00 00 00 FF FF FF FF FF FF		on. yyyyyy
3648	FF FF FE FF FF FF FE FF FF FF FF 00 00 00 00 00		yybyyybyyy
3664	00 00 FF FF FF FF 5F BF 7E 6F 6B 5D 24 00 FF FF		yyyy_!~ok]\$ yy


- STRUCTURALLY SPEAKING, WHAT WAS CHRONOLOGICALLY LAST IS FIRST IN THE FILE
- RED BOX – 9-BYTES THAT APPEAR BEFORE VOCAL INPUT
- FOUR VARIANTS OF WHAT WAS SAID IS GENERATED. EACH VARIANT IS GIVEN A DESIGNATION (Q, R, O, R)

Offset	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	ANSI ASCII
3552	61 00	6C 00	20 00	66 00	6F 00	72 00	65 00	6E 00	6F 00	72 00	65 00	6E 00	6F 00	72 00	65 00	6E 00	a l f o r e n
3568	73 00	69 00	63 00	20 00	72 00	65 00	73 00	65 00	72 00	65 00	73 00	65 00	72 00	65 00	73 00	65 00	s i c r e s e
3584	61 00	72 00	63 00	68 00	20 00	57 00	6F 00	72 00	6F 00	72 00	6F 00	72 00	6F 00	72 00	6F 00	72 00	a r c h W o r
3600	6B 00	73 00	68 00	6F 00	70 00	20 00	70 00	72 00	70 00	20 00	70 00	72 00	70 00	20 00	70 00	72 00	k s h o p p r
3616	65 00	73 00	65 00	6E 00	74 00	61 00	74 00	69 00	74 00	61 00	74 00	69 00	74 00	61 00	74 00	69 00	e s e n t a t i
3632	6F 00	6E 00	2E 00	00 00	00 00	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	o n . V V V V V V
3648	FF FF	FE FF	FF FF	FE FF	FF FF	FF FF	FF FF	00 00	00 00	00 00	00 00	00 00	00 00	00 00	00 00	00 00	V V V V V V V V
3664	00 00	FF FF	FF FF	FF FF	5F BF	7E 6F	6B 5D	24 00	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	V V V V _ i ~ o k } \$ V V
3680	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	04 01	00 00	42 4E	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	V V V V V V V V V V B N
3696	44 4C	02 00	00 00	17 00	00 00	61 00	70 00	70 00	DL	a p p							
3712	6C 00	69 00	63 00	61 00	74 00	69 00	6F 00	6E 00	l i c a t i o n								
3728	2D 00	69 00	64 00	2D 00	6F 00	76 00	65 00	72 00	- i d - o v e r								
3744	72 00	69 00	64 00	65 00	00 00	00 00	00 00	08 00	r i d e								
3760	00 00	67 00	65 00	61 00	72 00	68 00	65 00	61 00	g e a r h e a								
3776	64 00	00 00	00 00	11 00	00 00	75 00	73 00	65 00	d u s e								
3792	72 00	2D 00	61 00	67 00	65 00	6E 00	74 00	2D 00	r - a g e n t -								
3808	73 00	75 00	66 00	66 00	69 00	78 00	00 00	00 00	s u f f i x								
3824	00 00	3F 00	00 00	41 00	6E 00	64 00	72 00	6F 00	? A n d r o								
3840	69 00	64 00	41 00	75 00	74 00	6F 00	43 00	61 00	i d A u t o C a								
3856	72 00	53 00	63 00	72 00	65 00	65 00	6E 00	2F 00	r S c r e e n /								
3872	34 00	2E 00	33 00	2E 00	35 00	39 00	31 00	38 00	4 . 3 . 5 9 1 8								
3888	35 00	34 00	2D 00	72 00	65 00	6C 00	65 00	61 00	5 4 - r e l e a								
3904	73 00	65 00	20 00	4E 00	69 00	73 00	73 00	61 00	s e N i s s a								
3920	6E 00	20 00	4E 00	69 00	73 00	73 00	61 00	6E 00	n N i s s a n								
3936	5F 00	42 00	6F 00	73 00	63 00	68 00	5F 00	53 00	_ B o s c h _ S								
3952	55 00	56 00	00 00	1F 00	00 00	61 00	6E 00	64 00	U V a n d								
3968	72 00	6F 00	69 00	64 00	2E 00	6E 00	65 00	74 00	r o i d . n e t								
3984	2E 00	55 00	72 00	69 00	24 00	48 00	69 00	65 00	. U r i \$ H i e								
4000	72 00	61 00	72 00	63 00	68 00	69 00	63 00	61 00	r a r c h i c a								
4016	6C 00	55 00	72 00	69 00	00 00	03 00	00 00	07 00	l U r i								
4032	00 00	63 00	6F 00	6E 00	74 00	65 00	6E 00	74 00	c o n t e n t								
4048	00 00	00 00	00 00	2F 00	00 00	63 00	6F 00	6D 00	/ c o m								
4064	2E 00	67 00	6F 00	6F 00	67 00	6C 00	65 00	2E 00	. g o o g l e .								
4080	61 00	6E 00	64 00	72 00	6F 00	69 00	64 00	2E 00	a n d r o i d .								
4096	70 00	72 00	6F 00	6A 00	65 00	63 00	74 00	69 00	p r o j e c t i								
4112	6F 00	6E 00	2E 00	67 00	65 00	61 00	72 00	68 00	o n . g e a r h								
4128	65 00	61 00	64 00	2E 00	70 00	72 00	6F 00	76 00	e a d . p r o v								
4144	69 00	64 00	65 00	72 00	00 00	2F 00	00 00	63 00	i d e r / c								
4160	6F 00	6D 00	2E 00	67 00	6F 00	6F 00	67 00	6C 00	o m . g o o g l								
4176	65 00	2E 00	61 00	6E 00	64 00	72 00	6F 00	69 00	e . a n d r o i								
4192	64 00	2E 00	70 00	72 00	6F 00	6A 00	65 00	63 00	d . p r o j e c								
4208	74 00	69 00	6F 00	6E 00	2E 00	67 00	65 00	61 00	t i o n . g e a								
4224	72 00	68 00	65 00	61 00	64 00	2E 00	70 00	72 00	r h e a d . p r								
4240	6F 00	76 00	69 00	64 00	65 00	72 00	00 00	00 00	o v i d e r								
4256	00 00	04 00	00 00	2F 00	6D 00	69 00	63 00	00 00	/ m i c								
4272	00 00	04 00	00 00	2F 00	6D 00	69 00	63 00	00 00	/ m i c								
4288	00 00	00 00	00 00	FF FF	FF FF	FF FF	FF FF	FF FF	V V V V V V V V								
4304	00 00	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	FF FF	V V V V V V V V i u , o k								
4320	00 00	3F 00	00 00	63 00	6F 00	6D 00	2E 00	67 00	? c o m . g								

- Purple Box - Information about the Android Auto Version Number & Underlying Nissan Software (Nissan Connect uses Bosch OSS)

- RED BOX – TIME STAMP (READ LITTLE ENDIAN) IN UNIX EPOCH

DCode v4.02a (Build: 9306)


Convert Data to Date / Time Values

Add Bias: UTC -04:00 ☐ Window on top

Decode Format: Unix: Numeric Value

Example: 1170245478

Value to Decode: 1560947504589

Date & Time: Wed, 19 June 2019 08:31:44 -0400

www.digital-detective.co.uk

123536	79 00 00 00	01 4C 60 40	80 04 02 00 00	00 00 00	y L'@€
123552	00 00 00 00	00 00 00 00	27 00 00 00 73 00 65 00		' se
123568	6E 00 64 00	20 00 61 00	20 00 6E 00 65 00 77 00		nd a new
123584	20 00 74 00	65 00 78 00	74 00 20 00 6D 00 65 00		text me
123600	73 00 73 00	61 00 67 00	65 00 20 00 74 00 6F 00		ssage to
123616	20 00 4A 00	6F 00 73 00	68 00 20 00 48 00 69 00		Josh Hi
123632	63 00 6B 00	6D 00 61 00	6E 00 00 00 12 00 00 00		ckman
123648	12 00 00 00	72 00 65 00	63 00 6F 00 67 00 6E 00		recogn
123664	69 00 7A 00	65 00 72 00	4C 00 61 00 6E 00 67 00		izerLang
123680	75 00 61 00	67 00 65 00	00 00 00 00 05 00 00 00		uage
123696	65 00 6E 00	2D 00 75 00	73 00 00 00 00 00 00 00		en-us
123712	27 00 00 00	00 00 00 00	00 00 00 00 00 00 00 00		'
123728	04 00 00 00	28 00 00 00	73 00 65 00 6E 00 64 00		(send
123744	20 00 61 00	20 00 6E 00	65 00 77 00 20 00 74 00		a new t
123760	65 00 78 00	74 00 20 00	6D 00 65 00 73 00 73 00		ext mess
123776	61 00 67 00	65 00 20 00	74 00 6F 00 20 00 4A 00		age to J
123792	6F 00 73 00	68 00 20 00	48 00 69 00 63 00 6B 00		osh Hick
123808	6D 00 61 00	6E 00 2E 00	00 00 00 00 23 00 00 00		man. #
123824	73 00 65 00	6E 00 64 00	20 00 61 00 20 00 74 00		send a t
123840	65 00 78 00	74 00 20 00	6D 00 65 00 73 00 73 00		ext mess
123856	61 00 67 00	65 00 20 00	74 00 6F 00 20 00 4A 00		age to J
123872	6F 00 73 00	68 00 20 00	48 00 69 00 63 00 6B 00		osh Hick
123888	6D 00 61 00	6E 00 00 00	26 00 00 00 73 00 65 00		man & se
123904	6E 00 64 00	20 00 61 00	20 00 6E 00 65 00 77 00		nd a ew
123920	20 00 74 00	65 00 78 00	74 00 20 00 6D 00 65 00		text me
123936	73 00 73 00	61 00 67 00	65 00 20 00 74 00 6F 00		ssage to
123952	20 00 4A 00	6F 00 73 00	68 00 20 00 45 00 67 00		Josh Eg
123968	67 00 6D 00	61 00 6E 00	00 00 00 00 27 00 00 00		gman '
123984	73 00 65 00	6E 00 64 00	20 00 61 00 20 00 6E 00		send a n
124000	65 00 77 00	20 00 74 00	65 00 78 00 74 00 20 00		ew text
124016	6D 00 65 00	73 00 73 00	61 00 67 00 65 00 20 00		message
124032	74 00 6F 00	20 00 4A 00	6F 00 73 00 68 00 20 00		to Josh
124048	53 00 68 00	69 00 70 00	6D 00 61 00 6E 00 00 00		Shipman
124064	FF FF FF FF	FF FF FF FF	FE FF FF FF FE FF FF FF		YYYYYYYYpYYYYpYYY
124080	00 00 00 00	00 00 00 00	FF FF FF FF 5D BF 7E 6F		YYYY]¿~o
124096	6B 5D 24 00	FF FF FF FF	FF FF FF FF FF FF FF FF		k]\$ YYYYYYYYYYYYYY
124112	04 01 00 00	42 4E 44 4C	02 00 00 00 17 00 00 00		BNDL

- RED BOX – 9-BYTES THAT APPEAR BEFORE VOCAL INPUT
- PURPLE BOX – INITIAL VOCAL INPUT
- FOUR VARIANTS OF WHAT WAS SAID IS GENERATED. EACH VARIANT IS GIVEN A DESIGNATION ((, #, &, ')

126448	6C 65 2E 63 6F 6D 38 01 FF FF FF FF FF FF FF FF	le.com8 yyyyyyyyy
126464	FF FF FF FF 17 00 00 00 47 00 49 00 53 00 73 00	yyyy G I S s
126480	4B 00 58 00 64 00 6A 00 4F 00 41 00 38 00 2D 00	K X d j O A 8 -
126496	61 00 5F 00 51 00 62 00 62 00 6F 00 70 00 54 00	a _ Q b b o p T
126512	67 00 41 00 77 00 00 00 27 00 00 00 73 00 65 00	g A w ' s e
126528	6E 00 64 00 20 00 61 00 20 00 6E 00 65 00 77 00	n d a n e w
126544	20 00 74 00 65 00 78 00 74 00 20 00 6D 00 65 00	t e x t m e
126560	73 00 73 00 61 00 67 00 65 00 20 00 74 00 6F 00	s s a g e t o
126576	20 00 4A 00 6F 00 73 00 68 00 20 00 48 00 69 00	J o s h H i
126592	63 00 6B 00 6D 00 61 00 6E 00 00 00 02 00 00 00	c k m a n

TRANSACTION GUID?

170784	FF FF FF FF FF FF FF FF 00 00 00 00 00 00 00 00	00000000
170800	01 00 00 00 16 00 00 00 49 00 53 00 73 00 4B 00	I S s K
170816	58 00 64 00 6A 00 4F 00 41 00 38 00 2D 00 61 00	X d j O A 8 - a
170832	5F 00 51 00 62 00 62 00 6F 00 70 00 54 00 67 00	_ Q b b o p T g
170848	41 00 77 00 00 00 00 00 01 00 00 00 00 00 00 00	A w
170864	12 84 F2 02 FC B8 00 00 42 4E 44 4C 03 00 00 00	„ò ü, BNDL
170880	18 00 00 00 76 00 65 00 6C 00 76 00 65 00 74 00	v e l v e t
170896	3A 00 71 00 75 00 65 00 72 00 79 00 5F 00 73 00	: q u e r y _ s
170912	74 00 61 00 74 00 65 00 3A 00 71 00 75 00 65 00	t a t e : q u e
170928	72 00 79 00 00 00 00 00 04 00 00 00 2F 00 00 00	r y /
170944	63 00 6F 00 6D 00 2E 00 67 00 6F 00 6F 00 67 00	c o m . g o o g
170960	6C 00 65 00 2E 00 61 00 6E 00 64 00 72 00 6F 00	l e . a n d r o
170976	69 00 64 00 2E 00 61 00 70 00 70 00 73 00 2E 00	i d . a p p s .
170992	67 00 73 00 61 00 2E 00 73 00 68 00 61 00 72 00	g s a . s h a r
171008	65 00 64 00 2E 00 73 00 65 00 61 00 72 00 63 00	e d . s e a r c
171024	68 00 2E 00 51 00 75 00 65 00 72 00 79 00 00 00	h . Q u e r y
171040	01 4C 60 40 80 04 02 00 00 00 00 00 00 00 00 00	L'@€
171056	00 00 00 00 51 00 00 00 74 00 68 00 69 00 73 00	Q t h i s
171072	20 00 69 00 73 00 20 00 74 00 68 00 65 00 20 00	i s t h e
171088	74 00 65 00 73 00 74 00 20 00 6D 00 65 00 73 00	t e s t m e s
171104	73 00 61 00 67 00 65 00 20 00 66 00 6F 00 72 00	s a g e f o r
171120	20 00 74 00 68 00 65 00 20 00 64 00 69 00 67 00	t h e d i g
171136	69 00 74 00 61 00 6C 00 20 00 66 00 6F 00 72 00	i t a l f o r
171152	65 00 6E 00 73 00 69 00 63 00 20 00 72 00 65 00	e n s i c r e
171168	73 00 65 00 61 00 72 00 63 00 68 00 20 00 57 00	s e a r c h W
171184	6F 00 72 00 6B 00 73 00 68 00 6F 00 70 00 20 00	o r k s h o p
171200	70 00 72 00 65 00 73 00 65 00 6E 00 74 00 61 00	p r e s e n t a
171216	74 00 69 00 6F 00 6E 00 2E 00 00 00 12 00 00 00	t i o n .
171232	12 00 00 00 72 00 65 00 63 00 6F 00 67 00 6E 00	r e c o g n
171248	69 00 7A 00 65 00 72 00 4C 00 61 00 6E 00 67 00	i z e r L a n g
171264	75 00 61 00 67 00 65 00 00 00 00 00 05 00 00 00	u a g e
171280	65 00 6E 00 2D 00 75 00 73 00 00 00 00 00 00 00	e n - u s



171312	04 00 00 00 51 00 00 00	74 00 68 00 69 00 73 00	Q t h i s
171328	20 00 69 00 73 00 20 00	74 00 68 00 65 00 20 00	i s t h e
171344	74 00 65 00 78 00 74 00	20 00 6D 00 65 00 73 00	t e x t m e s
171360	73 00 61 00 67 00 65 00	20 00 66 00 6F 00 72 00	s a g e f o r
171376	20 00 74 00 68 00 65 00	20 00 64 00 69 00 67 00	t h e d i g
171392	69 00 74 00 61 00 6C 00	20 00 66 00 6F 00 72 00	i t a l f o r
171408	65 00 6E 00 73 00 69 00	63 00 20 00 72 00 65 00	e n s i c r e
171424	73 00 65 00 61 00 72 00	63 00 68 00 20 00 57 00	s e a r c h W
171440	6F 00 72 00 6B 00 73 00	68 00 6F 00 70 00 20 00	o r k s h o p
171456	70 00 72 00 65 00 73 00	65 00 6E 00 74 00 61 00	p r e s e n t a
171472	74 00 69 00 6F 00 6E 00	2E 00 00 00 52 00 00 00	t i o n . R
171488	74 00 68 00 69 00 73 00	20 00 69 00 73 00 20 00	t h i s i s
171504	74 00 68 00 65 00 20 00	74 00 65 00 73 00 74 00	t h e t e s t
171520	20 00 6D 00 65 00 73 00	73 00 61 00 67 00 65 00	m e s s a g e
171536	20 00 66 00 6F 00 72 00	20 00 74 00 68 00 65 00	f o r t h e
171552	79 00 20 00 64 00 69 00	67 00 69 00 74 00 61 00	y d i g i t a
171568	6C 00 20 00 66 00 6F 00	72 00 65 00 6E 00 73 00	l f o r e n s
171584	69 00 63 00 20 00 72 00	65 00 73 00 65 00 61 00	i c r e s e a
171600	72 00 63 00 68 00 20 00	57 00 6F 00 72 00 6B 00	r c h W o r k
171616	73 00 68 00 6F 00 70 00	20 00 70 00 72 00 65 00	s h o p p r e
171632	73 00 65 00 6E 00 74 00	61 00 74 00 69 00 6F 00	s e n t a t i o
171648	6E 00 2E 00 00 00 00 00	4F 00 00 00 74 00 68 00	n . O t h
171664	69 00 73 00 20 00 69 00	73 00 20 00 74 00 68 00	i s i s t h
171680	65 00 20 00 74 00 65 00	73 00 74 00 20 00 6D 00	e t e s t m
171696	65 00 73 00 73 00 61 00	67 00 65 00 20 00 34 00	e s s a g e 4
171712	20 00 74 00 68 00 65 00	20 00 64 00 69 00 67 00	t h e d i g
171728	69 00 74 00 61 00 6C 00	20 00 66 00 6F 00 72 00	i t a l f o r
171744	65 00 6E 00 73 00 69 00	63 00 20 00 72 00 65 00	e n s i c r e
171760	73 00 65 00 61 00 72 00	63 00 68 00 20 00 57 00	s e a r c h W
171776	6F 00 72 00 6B 00 73 00	68 00 6F 00 70 00 20 00	o r k s h o p
171792	70 00 72 00 65 00 73 00	65 00 6E 00 74 00 61 00	p r e s e n t a
171808	74 00 69 00 6F 00 6E 00	2E 00 00 00 52 00 00 00	t i o n . R
171824	74 00 68 00 69 00 73 00	20 00 69 00 73 00 20 00	t h i s i s
171840	74 00 68 00 65 00 20 00	74 00 65 00 73 00 74 00	t h e t e s t
171856	73 00 20 00 6D 00 65 00	73 00 73 00 61 00 67 00	s m e s s a g
171872	65 00 20 00 66 00 6F 00	72 00 20 00 74 00 68 00	e f o r t h
171888	65 00 20 00 64 00 69 00	67 00 69 00 74 00 61 00	e d i g i t a
171904	6C 00 20 00 66 00 6F 00	72 00 65 00 6E 00 73 00	l f o r e n s
171920	69 00 63 00 20 00 72 00	65 00 73 00 65 00 61 00	i c r e s e a
171936	72 00 63 00 68 00 20 00	57 00 6F 00 72 00 6B 00	r c h W o r k
171952	73 00 68 00 6F 00 70 00	20 00 70 00 72 00 65 00	s h o p p r e
171968	73 00 65 00 6E 00 74 00	61 00 74 00 69 00 6F 00	s e n t a t i o
171984	6E 00 2E 00 00 00 00 00	FF FF FF FF FF FF FF FF	n . YYYYYYYY
172000	FE FF FF FF FE FF FF FF	00 00 00 00 00 00 00 00	bYYYYbYYY
172016	FF FF FF FF 5E BF 7E 6F	6B 5D 24 00 FF FF FF FF	YYYY^i~ok]\$ YYYY
172032	FF FF FF FF FF FF FF FF	04 01 00 00 42 4E 44 4C	YYYYYYYY BNDL

- THESE ARE THE SAME FOUR VARIANTS PREVIOUSLY SEEN
- THE DESIGNATIONS ARE THE SAME, TOO! (Q, R, O, & R)

Offset	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	ANSI ASCII
171872	65	00	20	00	66	00	6F	00	72	00	20	00	74	00	68	00	e f o r t h
171888	65	00	20	00	64	00	69	00	67	00	69	00	74	00	61	00	e d i g i t a
171904	6C	00	20	00	66	00	6F	00	72	00	65	00	6E	00	73	00	l f o r e n s
171920	69	00	63	00	20	00	72	00	65	00	73	00	65	00	61	00	i c r e s e a
171936	72	00	63	00	68	00	20	00	57	00	6F	00	72	00	6B	00	r c h W o r k
171952	73	00	68	00	6F	00	70	00	20	00	70	00	72	00	65	00	s h o p p r e
171968	73	00	65	00	6E	00	74	00	61	00	74	00	69	00	6F	00	s e n t a t i o
171984	6E	00	2E	00	00	00	00	00	FF	FF	FF	FF	FF	FF	FF	FF	n .
172000	FE	FF	FF	FF	FE	FF	FF	FF	00	00	00	00	00	00	00	00	b y y y b y y y
172016	FF	FF	FF	FF	5E	BF	7E	6F	6B	5D	24	00	FF	FF	FF	FF	y y y y ^ { ~ o k } \$ y y y y
172032	FF	FF	FF	FF	FF	FF	FF	FF	04	01	00	00	42	4E	44	4C	y y y y y y y y B N D L
172048	02	00	00	00	17	00	00	00	61	00	70	00	70	00	6C	00	a p p l
172064	69	00	63	00	61	00	74	00	69	00	6F	00	6E	00	2D	00	i c a t i o n -
172080	69	00	64	00	2D	00	6F	00	76	00	65	00	72	00	72	00	i d - o v e r r
172096	69	00	64	00	65	00	00	00	00	00	00	00	08	00	00	00	i d e
172112	67	00	65	00	61	00	72	00	68	00	65	00	61	00	64	00	g e a r h e a d
172128	00	00	00	00	11	00	00	00	75	00	73	00	65	00	72	00	u s e r
172144	2D	00	61	00	67	00	65	00	6E	00	74	00	2D	00	73	00	- a g e n t - s
172160	75	00	66	00	66	00	69	00	78	00	00	00	00	00	00	00	u f f i x
172176	3F	00	00	00	41	00	6E	00	64	00	72	00	6F	00	69	00	? A n d r o i
172192	64	00	41	00	75	00	74	00	6F	00	43	00	61	00	72	00	d A u t o C a r
172208	53	00	63	00	72	00	65	00	65	00	6E	00	2F	00	34	00	S c r e e n / 4
172224	2E	00	33	00	2E	00	35	00	39	00	31	00	38	00	35	00	. 3 . 5 9 1 8 5
172240	34	00	2D	00	72	00	65	00	6C	00	65	00	61	00	73	00	4 - r e l e a s
172256	65	00	20	00	4E	00	69	00	73	00	73	00	61	00	6E	00	e N i s s a n
172272	20	00	4E	00	69	00	73	00	73	00	61	00	6E	00	5F	00	N i s s a n _
172288	42	00	6F	00	73	00	63	00	68	00	5F	00	53	00	55	00	B o s c h _ S U
172304	56	00	00	00	1F	00	00	00	61	00	6E	00	64	00	72	00	V a n d r
172320	6F	00	69	00	64	00	2E	00	6E	00	65	00	74	00	2E	00	o i d . n e t .
172336	55	00	72	00	69	00	24	00	48	00	69	00	65	00	72	00	U r i \$ H i e r
172352	61	00	72	00	63	00	68	00	69	00	63	00	61	00	6C	00	a r c h i c a l
172368	55	00	72	00	69	00	00	00	03	00	00	00	07	00	00	00	U r i
172384	63	00	6F	00	6E	00	74	00	65	00	6E	00	74	00	00	00	c o n t e n t
172400	00	00	00	00	2F	00	00	00	63	00	6F	00	6D	00	2E	00	/ c o m .
172416	67	00	6F	00	6F	00	67	00	6C	00	65	00	2E	00	61	00	g o o g l e . a
172432	6E	00	64	00	72	00	6F	00	69	00	64	00	2E	00	70	00	n d r o i d . p
172448	72	00	6F	00	6A	00	65	00	63	00	74	00	69	00	6F	00	r o j e c t i o
172464	6E	00	2E	00	67	00	65	00	61	00	72	00	68	00	65	00	n . g e a r h e
172480	61	00	64	00	2E	00	70	00	72	00	6F	00	76	00	69	00	a d . p r o v i
172496	64	00	65	00	72	00	00	00	2F	00	00	00	63	00	6F	00	d e r / c o
172512	6D	00	2E	00	67	00	6F	00	6F	00	67	00	6C	00	65	00	m . g o o g l e
172528	2E	00	61	00	6E	00	64	00	72	00	6F	00	69	00	64	00	. a n d r o i d
172544	2E	00	70	00	72	00	6F	00	6A	00	65	00	63	00	74	00	. p r o j e c t
172560	69	00	6F	00	6E	00	2E	00	67	00	65	00	61	00	72	00	i o n . g e a r
172576	68	00	65	00	61	00	64	00	2E	00	70	00	72	00	6F	00	h e a d . p r o
172592	76	00	69	00	64	00	65	00	72	00	00	00	00	00	00	00	v i d e r
172608	04	00	00	00	2F	00	6D	00	69	00	63	00	00	00	00	00	/ m i c
172624	04	00	00	00	2F	00	6D	00	69	00	63	00	00	00	00	00	/ m i c
172640	00	00	00	00	FF	FF	FF	FF	FF	FF	FF	FF	00	00	00	00	y y y y y y y y
172656	FF	FF	FF	FF	FF	FF	FF	FF	B9	7A	B8	6F	6B	01	00	00	y y y y y y y y ' z , o k
172672	3F	00	00	00	63	00	6F	00	6D	00	2E	00	67	00	6F	00	? c o m . g o

- TIMESTAMP IS 8 SECONDS AFTER WHAT WAS SEEN IN THE VIDEO.

DCode v4.02a (Build: 9306)

Convert Data to Date / Time Values

Add Bias: UTC -04:00 ☐ Window on top

Decode Format: Unix: Numeric Value

Example: 1170245478

Value to Decode: 1560947489465

Date & Time: Wed, 19 June 2019 08:31:29 -0400

www.digital-detective.co.uk

174384	FF FF FF FF FF FF FF FF	FF FF FF FF 17 00 00 00	000000000000
174400	47 00 49 00 53 00 73 00	4B 00 58 00 64 00 6A 00	G I S S K X d j
174416	4F 00 41 00 38 00 2D 00	61 00 5F 00 51 00 62 00	O A 8 - a _ Q b
174432	62 00 6F 00 70 00 54 00	67 00 41 00 77 00 00 00	b o p T g A w
174448	27 00 00 00 73 00 65 00	6E 00 64 00 20 00 61 00	' s e n d a
174464	20 00 6E 00 65 00 77 00	20 00 74 00 65 00 78 00	n e w t e x
174480	74 00 20 00 6D 00 65 00	73 00 73 00 61 00 67 00	t m e s s a g
174496	65 00 20 00 74 00 6F 00	20 00 4A 00 6F 00 73 00	e t o J o s
174512	68 00 20 00 48 00 69 00	63 00 6B 00 6D 00 61 00	h H i c k m a
174528	6E 00 00 00 02 00 00 00	04 00 00 00 52 00 00 00	n R
174544	63 00 6F 00 6D 00 2E 00	67 00 6F 00 6F 00 67 00	c o m . g o o g
174560	6C 00 65 00 2E 00 61 00	6E 00 64 00 72 00 6F 00	l e . a n d r o
174576	69 00 64 00 2E 00 61 00	70 00 70 00 73 00 2E 00	i d . a p p s .
174592	67 00 73 00 61 00 2E 00	73 00 65 00 61 00 72 00	g s a . s e a r
174608	63 00 68 00 2E 00 73 00	68 00 61 00 72 00 65 00	c h . s h a r e
174624	64 00 2E 00 61 00 63 00	74 00 69 00 6F 00 6E 00	d . a c t i o n
174640	73 00 2E 00 6D 00 6F 00	64 00 75 00 6C 00 61 00	s . m o d u l a
174656	72 00 2E 00 61 00 72 00	67 00 75 00 6D 00 65 00	r . a r g u m e
174672	6E 00 74 00 73 00 2E 00	50 00 65 00 72 00 73 00	n t s . P e r s
174688	6F 00 6E 00 41 00 72 00	67 00 75 00 6D 00 65 00	o n A r g u m e
174704	6E 00 74 00 00 00 00 00	14 00 00 00 08 01 12 02	n t
174720	54 6F 18 02 28 D1 34 CA	3E 06 0A 02 20 01 12 00	To (Ñ4Ê>
174736	46 00 00 00 63 00 6F 00	6D 00 2E 00 67 00 6F 00	F c o m . g o
174752	6F 00 67 00 6C 00 65 00	2E 00 61 00 6E 00 64 00	o g l e . a n d
174768	72 00 6F 00 69 00 64 00	2E 00 61 00 70 00 70 00	r o i d . a p p
174784	73 00 2E 00 67 00 73 00	61 00 2E 00 73 00 65 00	s . g s a . s e
174800	61 00 72 00 63 00 68 00	2E 00 73 00 68 00 61 00	a r c h . s h a
174816	72 00 65 00 64 00 2E 00	63 00 6F 00 6E 00 74 00	r e d . c o n t
174832	61 00 63 00 74 00 2E 00	50 00 65 00 72 00 73 00	a c t . P e r s
174848	6F 00 6E 00 44 00 69 00	73 00 61 00 6D 00 62 00	o n D i s a m b
174864	69 00 67 00 75 00 61 00	74 00 69 00 6F 00 6E 00	i g u a t i o n
174880	00 00 00 00 01 00 00 00	38 00 00 00 63 00 6F 00	s c o
174896	6D 00 2E 00 67 00 6F 00	6F 00 67 00 6C 00 65 00	m . g o o g l e
174912	2E 00 61 00 6E 00 64 00	72 00 6F 00 69 00 64 00	. a n d r o i d
174928	2E 00 61 00 70 00 70 00	73 00 2E 00 67 00 73 00	. a p p s . g s
174944	61 00 2E 00 73 00 65 00	61 00 72 00 63 00 68 00	a . s e a r c h
174960	2E 00 73 00 68 00 61 00	72 00 65 00 64 00 2E 00	. s h a r e d .
174976	63 00 6F 00 6E 00 74 00	61 00 63 00 74 00 2E 00	c o n t a c t .
174992	50 00 65 00 72 00 73 00	6F 00 6E 00 00 00 00 00	P e r s o n
175008	01 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00	
175024	00 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00	
175040	15 00 00 00 33 00 32 00	39 00 38 00 69 00 32 00	3 2 9 8 i 2
175056	35 00 31 00 31 00 65 00	34 00 34 00 35 00 38 00	5 1 1 e 4 4 5 8
175072	62 00 64 00 34 00 66 00	62 00 61 00 33 00 00 00	b d 4 f b a 3
175088	0C 00 00 00 4A 00 6F 00	73 00 68 00 20 00 48 00	J o s h H
175104	69 00 63 00 6B 00 6D 00	61 00 6E 00 00 00 00 00	i c k m a n
175120	0C 00 00 00 4A 00 6F 00	73 00 68 00 20 00 48 00	J o s h H
175136	69 00 63 00 6B 00 6D 00	61 00 6E 00 00 00 00 00	i c k m a n
175152	00 00 00 00 01 00 00 00	04 00 00 00 39 00 00 00	9

- THE SAME TRANSACTION GUID IS PRESENT
- RED BOX – THIS IS THE “LOOKUP KEY” IN THE PARTICIPANTS TABLE OF THE BUGLE DATABASE

14	14	-2	-1	+19198157840	9198157840	(919) 815-7840	NULL	NULL
15	15	-2	-1				Josh Hickman	Josh
16	16	-2	-1	+19198849273	9198849273	(919) 884-9273	NULL	NULL

14	NULL	NULL	NULL	-2	NULL
15	Josh Hickman	Josh	NULL	1	3298i2511e4458bd4fba3
16	NULL	NULL	NULL	-2	NULL

178432	6E 00 74 00 00 00 00 00	6A 00 00 00 08 02 18 04	n t j
178448	28 99 3A 52 09 0A 07 4D	65 73 73 61 67 65 C2 3E	(™:R Message>
178464	55 12 51 54 68 69 73 20	69 73 20 74 68 65 20 74	U QThis is the t
178480	65 73 74 20 6D 65 73 73	61 67 65 20 66 6F 72 20	est message for
178496	74 68 65 20 64 69 67 69	74 61 6C 20 66 6F 72 65	the digital fore
178512	6E 73 69 63 20 72 65 73	65 61 72 63 68 20 57 6F	nsic research Wo
178528	72 6B 73 68 6F 70 20 70	72 65 73 65 6E 74 61 74	rkshop presentat
178544	69 6F 6E 2E 18 02 00 00	54 00 00 00 63 00 6F 00	ion. T c o
178560	6D 00 2E 00 67 00 6F 00	6F 00 67 00 6C 00 65 00	m . g o o g l e
178576	2E 00 61 00 6E 00 64 00	72 00 6F 00 69 00 64 00	. a n d r o i d

THIS IS THE ONE



218160	FF FF FF FF 00 00 00 00	00 00 00 00 01 00 00 00	yyyy
218176	14 00 00 00 4C 00 69 00	73 00 4B 00 58 00 61 00	L i s K X a
218192	75 00 31 00 47 00 71 00	5F 00 74 00 35 00 67 00	u 1 G q _ t 5 g
218208	4C 00 63 00 6B 00 34 00	55 00 51 00 00 00 00 00	L c k 4 U Q
218224	01 00 00 00 00 00 00 00	12 B8 A8 01 30 54 00 00	, 01
218240	42 4E 44 4C 03 00 00 00	18 00 00 00 76 00 65 00	BNDL ve
218256	6C 00 76 00 65 00 74 00	3A 00 71 00 75 00 65 00	l v e t : q u e
218272	72 00 79 00 5F 00 73 00	74 00 61 00 74 00 65 00	r y _ s t a t e
218288	3A 00 71 00 75 00 65 00	72 00 79 00 00 00 00 00	: q u e r y
218304	04 00 00 00 2F 00 00 00	63 00 6F 00 6D 00 2E 00	/ c o m .
218320	67 00 6F 00 6F 00 67 00	6C 00 65 00 2E 00 61 00	g o o g l e . a
218336	6E 00 64 00 72 00 6F 00	69 00 64 00 2E 00 61 00	n d r o i d . a
218352	70 00 70 00 73 00 2E 00	67 00 73 00 61 00 2E 00	p p s . g s a .
218368	73 00 68 00 61 00 72 00	65 00 64 00 2E 00 73 00	s h a r e d . s
218384	65 00 61 00 72 00 63 00	68 00 2E 00 51 00 75 00	e a r c h . Q u
218400	65 00 72 00 79 00 00 00	01 4C 60 40 80 04 02 00	e r y L'@€
218416	00 00 00 00 00 00 00 00	00 00 00 00 07 00 00 00	
218432	73 00 65 00 6E 00 64 00	20 00 69 00 74 00 00 00	s e n d i t
218448	12 00 00 00 12 00 00 00	72 00 65 00 63 00 6F 00	r e c o
218464	67 00 6E 00 69 00 7A 00	65 00 72 00 4C 00 61 00	g n i z e r L a
218480	6E 00 67 00 75 00 61 00	67 00 65 00 00 00 00 00	n g u a g e
218496	05 00 00 00 65 00 6E 00	2D 00 75 00 73 00 00 00	e n - u s
218512	00 00 00 00 07 00 00 00	00 00 00 00 00 00 00 00	

218560	FF FF FF FF 5F BF 7E 6F	6B 5D 24 00 FF FF FF FF	yyyy_~ok]\$ yyyy
218576	FF FF FF FF FF FF FF FF	04 01 00 00 42 4E 44 4C	yyyyyyyy BNDL
218592	02 00 00 00 17 00 00 00	61 00 70 00 70 00 6C 00	a p p l
218608	69 00 63 00 61 00 74 00	69 00 6F 00 6E 00 2D 00	i c a t i o n -
218624	69 00 64 00 2D 00 6F 00	76 00 65 00 72 00 72 00	i d - o v e r r
218640	69 00 64 00 65 00 00 00	00 00 00 00 08 00 00 00	i d e
218656	67 00 65 00 61 00 72 00	68 00 65 00 61 00 64 00	g e a r h e a d
218672	00 00 00 00 11 00 00 00	75 00 73 00 65 00 72 00	u s e r
218688	2D 00 61 00 67 00 65 00	6E 00 74 00 2D 00 73 00	- a g e n t - s
218704	75 00 66 00 66 00 69 00	78 00 00 00 00 00 00 00	u f f i x
218720	3F 00 00 00 41 00 6E 00	64 00 72 00 6F 00 69 00	? A n d r o i
218736	64 00 41 00 75 00 74 00	6F 00 43 00 61 00 72 00	d A u t o C a r
218752	53 00 63 00 72 00 65 00	65 00 6E 00 2F 00 34 00	S c r e e n / 4
218768	2E 00 33 00 2E 00 35 00	39 00 31 00 38 00 35 00	. 3 . 5 9 1 8 5
218784	34 00 2D 00 72 00 65 00	6C 00 65 00 61 00 73 00	4 - r e l e a s
218800	65 00 20 00 4E 00 69 00	73 00 73 00 61 00 6E 00	e N i s s a n
218816	20 00 4E 00 69 00 73 00	73 00 61 00 6E 00 5F 00	N i s s a n _
218832	42 00 6F 00 73 00 63 00	68 00 5F 00 53 00 55 00	B o s c h _ S U
218848	56 00 00 00 1F 00 00 00	61 00 6E 00 64 00 72 00	V a n d r
218864	6F 00 69 00 64 00 2E 00	6E 00 65 00 74 00 2E 00	o i d . n e t .
218880	55 00 72 00 69 00 24 00	48 00 69 00 65 00 72 00	U r i \$ H i e r
218896	61 00 72 00 63 00 68 00	69 00 63 00 61 00 6C 00	a r c h i c a l
218912	55 00 72 00 69 00 00 00	03 00 00 00 07 00 00 00	U r i
218928	63 00 6F 00 6E 00 74 00	65 00 6E 00 74 00 00 00	c o n t e n t
218944	00 00 00 00 2F 00 00 00	63 00 6F 00 6D 00 2E 00	/ c o m .
218960	67 00 6F 00 6F 00 67 00	6C 00 65 00 2E 00 61 00	g o o g l e . a
218976	6E 00 64 00 72 00 6F 00	69 00 64 00 2E 00 70 00	n d r o i d . p
218992	72 00 6F 00 6A 00 65 00	63 00 74 00 69 00 6F 00	r o j e c t i o
219008	6E 00 2E 00 67 00 65 00	61 00 72 00 68 00 65 00	n . g e a r h e
219024	61 00 64 00 2E 00 70 00	72 00 6F 00 76 00 69 00	a d . p r o v i
219040	64 00 65 00 72 00 00 00	2F 00 00 00 63 00 6F 00	d e r / c o
219056	6D 00 2E 00 67 00 6F 00	6F 00 67 00 6C 00 65 00	m . g o o g l e
219072	2E 00 61 00 6E 00 64 00	72 00 6F 00 69 00 64 00	. a n d r o i d
219088	2E 00 70 00 72 00 6F 00	6A 00 65 00 63 00 74 00	. p r o j e c t
219104	69 00 6F 00 6E 00 2E 00	67 00 65 00 61 00 72 00	i o n . g e a r
219120	68 00 65 00 61 00 64 00	2E 00 70 00 72 00 6F 00	h e a d . p r o
219136	76 00 69 00 64 00 65 00	72 00 00 00 00 00 00 00	v i d e r
219152	04 00 00 00 2F 00 6D 00	69 00 63 00 00 00 00 00	/ m i c
219168	04 00 00 00 2F 00 6D 00	69 00 63 00 00 00 00 00	/ m i c
219184	00 00 00 00 FF FF FF FF	FF FF FF FF 00 00 00 00	yyyyyyyy
219200	FF FF FF FF FF FF FF FF	CD B5 B8 6F 6B 01 00 00	yyyyyyyyiu,ok
219216	3F 00 00 00 63 00 6F 00	6D 00 2E 00 67 00 6F 00	? c o m . g o

DCode v4.02a (Build: 9306)

DCode
Convert Data to Date / Time Values

Add Bias: ☐ Window on top

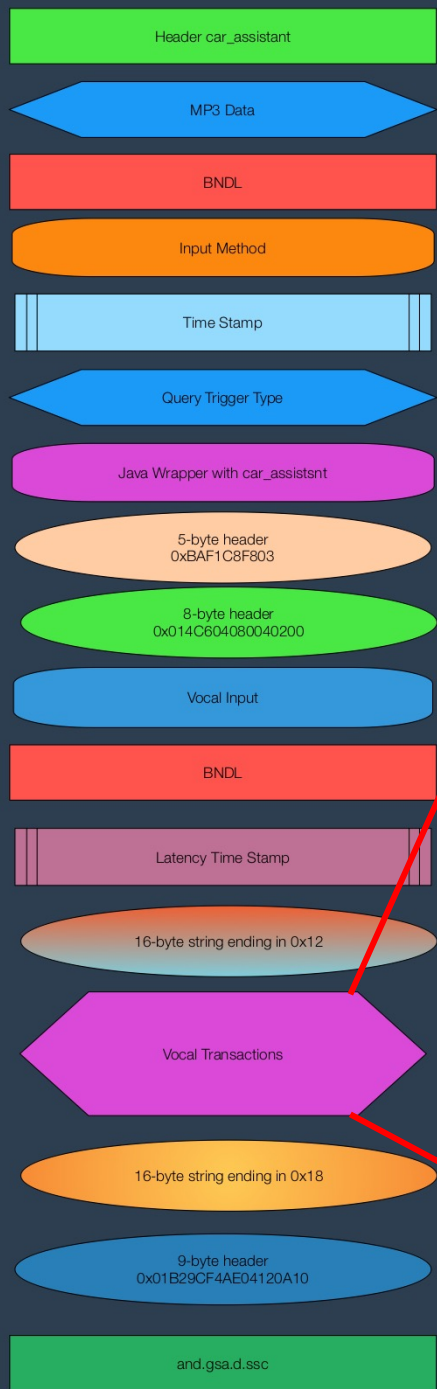
Decode Format:

Example:

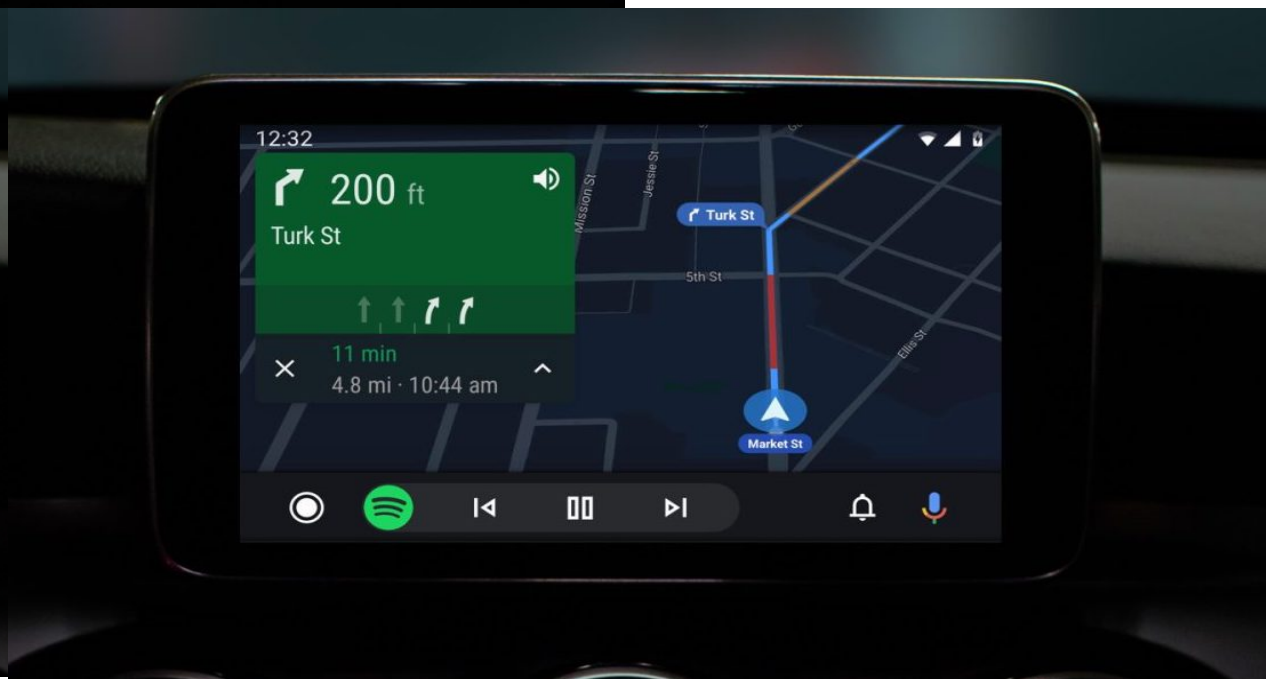
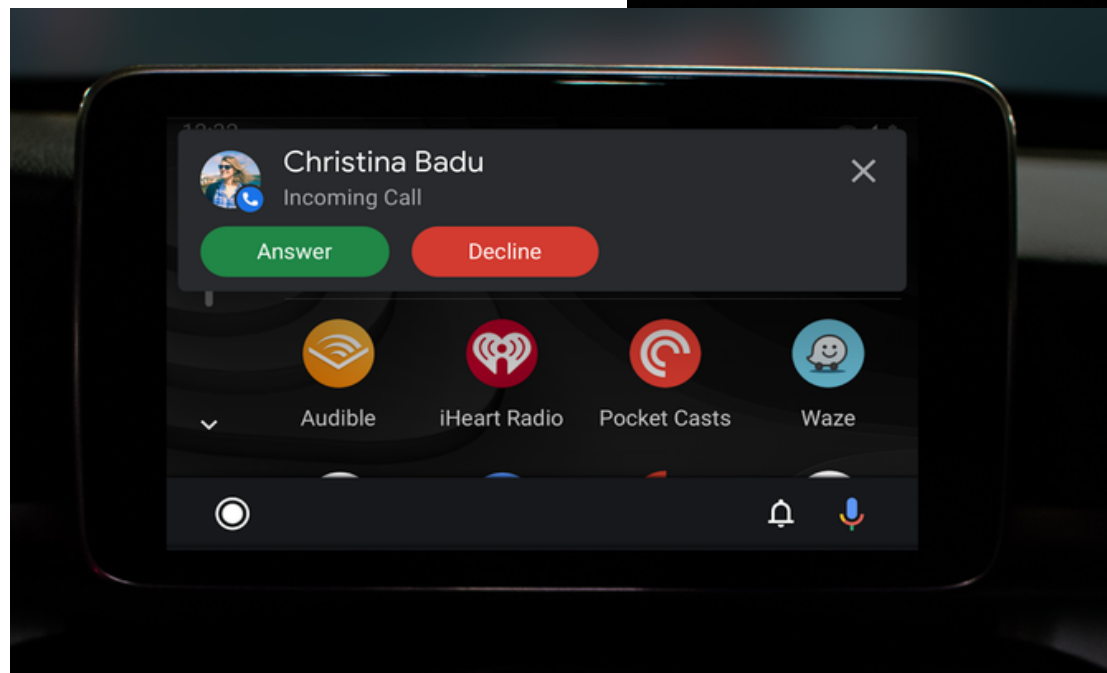
Value to Decode:

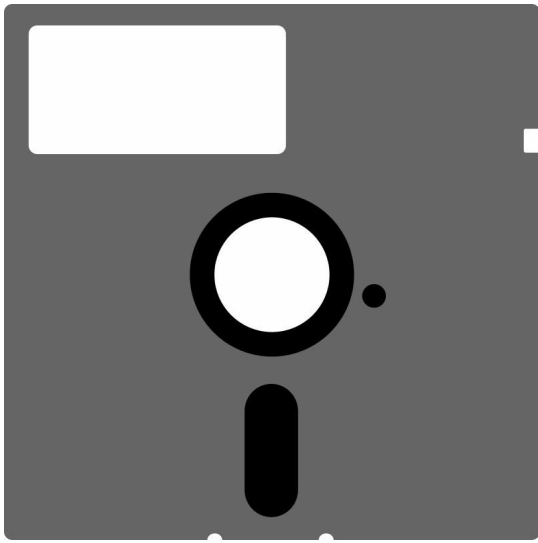
Date & Time:

www.digital-detective.co.uk



The Road Ahead





Josh Hickman

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North Carolina State Crime Laboratory

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