SUMMARY OF TELEMETRY READOUT FOR 7105 SERIES

As with ~~SCORE~~, all payloads of 7105 are equipped with a telemetry transmitter. In general, this tran[redacted] operates continuously and provides, among other things, information about the status of the DL system. Of particular interest is the status of the command system as related to the DL operation. The purpose of this report is to define this portion of the telemetry and its application to payloads of this series.

I. In an attempt to simplify the payload readout, each payload has been equipped with a separate sub-carrier channel, allocated specifically for DL information. Those allocated are:

7105A - Ch4 (885-1035 cps)
7105B - Ch5 (1200-1400 cps)
7105C - Ch6 (1575-1825 cps)
7105D - Ch7 (2125-2475 cps)

Note that each payload has a different channel. This is done to facilitate identification of the payload. The format is the same on each payload and the following description applies to all. Items unique to a particular payload will be identified as such.

The format of the DL channel is a 16 segment commutator, operating at a rate of two segments per second. The segment allocations are as follows:

SEGMENT NO.	ALLOCATION
1	DL Band 1
2	DL Band 2
3	DL Band 3
4	DL Band 4
5	DL Band 5
6	DL Band 6
7	DL Band 7
8	DL Band 8
9	DL Band 9
10	DL Band 10
11	DL Band 11
12	DL Band 12
13	Execute R.P.I.
14	R&D R.P.I.

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SEGMENT NO.	ALLOCATION
15	0 Volt Calibrate
16	5 Volt Calibrate

More specifically, segments 1 -> 12 indicate whether the associated DL systems are turned on or off. They are two level indicators (low or high), being low if the DL Band is off and high if the Band is on. Figure 1 represents a typical readout. Note that adjacent segments are alternated in level in both the 'high' position and the 'low' position. This is done to facilitate the reading (counting) of the segments. The difference between 'high' and 'low' vrs. level alternation is apparent from this figure. Segment 13 is the EXECUTE relay position indicator (R.P.I.) and is 'low' if the payload is not EXECUTED. Conversely, if the payload is EXECUTED, (KI command has been received) segment 13 will be 'high'. A more complete description of segment 13 follows.

Segment 14 is the R&D R.P.I. It is a three level R.P.I. in 7105A and a two level R.P.I. in 05 B & D. As 05C does not have an R&D experiment, segment 14 will always be low in that payload.

More specifically:

7105A-

The R&D experiment in this payload is called the

7105B-

The R&D experiment in this payload is the SLX (for Signal Level Experiment). As this experiment is either on or off, only a two level R.P.I. is necessary. The 'high' level indicates the SLX is on and 'low' indicates off.

7105D-

The R&D experiment in this payload is the CWX (Continuous Wave Chopping Experiment). As with 05B, this experiment is either on or off. The operation of segment 14 is identical to that of 05B.

Segment 15 is the so called 0 Volt calibrate segment. This name is derived from the fact that this segment to perform a calibrate function on the

payload's sub-carrier oscillator. During this calibrate interval, the sub-carrier is used to sample a 0 volt source internal to the payload. As a result, the output frequency should be such that the segment will be at the low bandedge of the strip chart (if it's calibrated). Segment 16 is identical to Segment 15 with the exception that it samples a precision 5 volt source in the payload. This in turn will result in a strip chart deflection to the high bandedge.

As the transition from low bandedge to high bandedge occurs only at this point in the format, it is a convenient point to start counting segments. Thus, the first segment after the calibrate sequence (segment 1) is identified as being the DL 1 indicator.

II. In operation, when the payload is reset, all DL systems are turned off and all information segments of the DL channel will be 'low'. As the DL bands are turned on, their associated segments will move from the low to the 'high' position, followed by the transition of segment 13 from 'low' to the 'high' position when the EXECUTE command is received. The segments will remain in this position until the RESET command is received.

III. In addition to the standard tasking capabilities of the 05 series, three additional modes of operation have been established. These modes are identified as the 'Recycling' Mode 1, Mode 2 and Mode 3. A brief explanation of each mode will be given and then a means of determining which operational mode the payload is in will be defined.

The Recycle Mode, as such, is used when it is desired to recycle a given task assignment, i.e., if one desires to repeat a given task assignment over the same general geographic location a number of times, the payload's may be commanded to automatically reactivate the given task assignment every 100 min's. This corresponds to a period of 50 min's ON and 50 min's OFF and the telemetry indication will vary depending on which portion of the cycle you are in.

The three Recycling Modes which are available are -

Mode 1: In this mode, the payload will go into an operational status at the instant the 'execute' command is received. This is defined as the ON portion of Mode 1. After an interval of roughly 50 minutes the payload will automatically shut off but the original task assignment will be retained within the command system. The payload will remain [redacted] (all in Mode 1) for the balance of the 100 min. period

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(an additional 50 min's) and then automatically recycle back ON with the original task assignment. The operation will continue in this mode until a ground command is sent to terminate the operation. The telemetry information pertaining to what Mode the payload is in is provided on the 'execute' segment #13. This segment is act [redacted] '5' level indicator and the levels are defined as below:

First, the amplitude of any given segment may be defined as a 'voltage'. That is to say, the low bandedge is actually '0' volts while the high bandedge is exactly '5' volts. Then a segment that appeared at 'mid' scale would represent $2\frac{1}{2}$ volts. Thus, the execute segment has been divided up into the following levels:

LEVEL	VOLTAGE
High	4v
High - Mid	3v
Mid	2.5v
Low Mid	2v
Low	.5v

Thus, when the payload is 'executed' and segment 13 goes to the 'high' position, it actually goes to the 4 volt level.

In the Mode 1 condition and during the ON portion of the cycle, segment 13 will go to the 3v level. After 50 min of ON operation, the system will cycle OFF and segment 13 will drop to the 2 v level. After an additional 50 min. the system recycles ON and segment 13 returns to the 3v level and so forth until the recycling action is terminated by command.

Mode 2 operation is similar to Mode 1 except that the recycle mode is shifted $\frac{1}{2}$ cycle by command. That is, the payload starts in the OFF half of the time cycle and then cycles ON. It will continue this alternating action, as with Mode 1, until terminated by command. Note that the operation in Mode 2 is really no different than Mode 1 except that the "time' is changed.

Thus, the telemetry levels are - Mode 2 in the "OFF" state (as when commanded) - 2v level.

Mode 2 in the "ON" state (50 min. after command) - 3v level.

Mode 3: Mode 3 is identical to Mode 2 except operation is limited to only one complete cycle, i.e., when commanded into this mode, the payload will start in the OFF cycle. After a 50 min. delay, the payload will cycle ON for 50

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additional minutes. At the end of this interval, the payload will reset and recycling action will terminate.

During the first portion of Mode 3, the telemetry will indicate the 2.5 volt level. During the second half of the cycle (the ON portion), the telemetry will show the normal execute level of 4v and after this interval, reset will occur and the telemetry will read the .5 volt level.

It is important to note that during any portion of the time cycle in any of the three modes of recycling operation, all the telemetry segments except segment 13 (execute - recycle segment) will indicate as normal. Thus, even though the payload may be in the OFF portion of the cycle, segments 1 -> 12 and 14 will read as tasked. ONLY segment 13 indicates the payload operational status.

In summary, the segment 13 levels are:

Operational Mode	Level
System executed - no recycle modes	4 volt
" " Mode 1 ON Portion	3 volt
" " " " OFF Portion	2 volt
" " Mode 2 OFF Portion	2 volt
" " " " ON Portion	3 volt
" " Mode 3 - OFF Portion	2.5 volt
" " " - ON Portion	4 volt
System Reset	.5 volt

IV. It is anticipated that given a minimum amount of time, identification of the DL channel and information contained therein will become automatic

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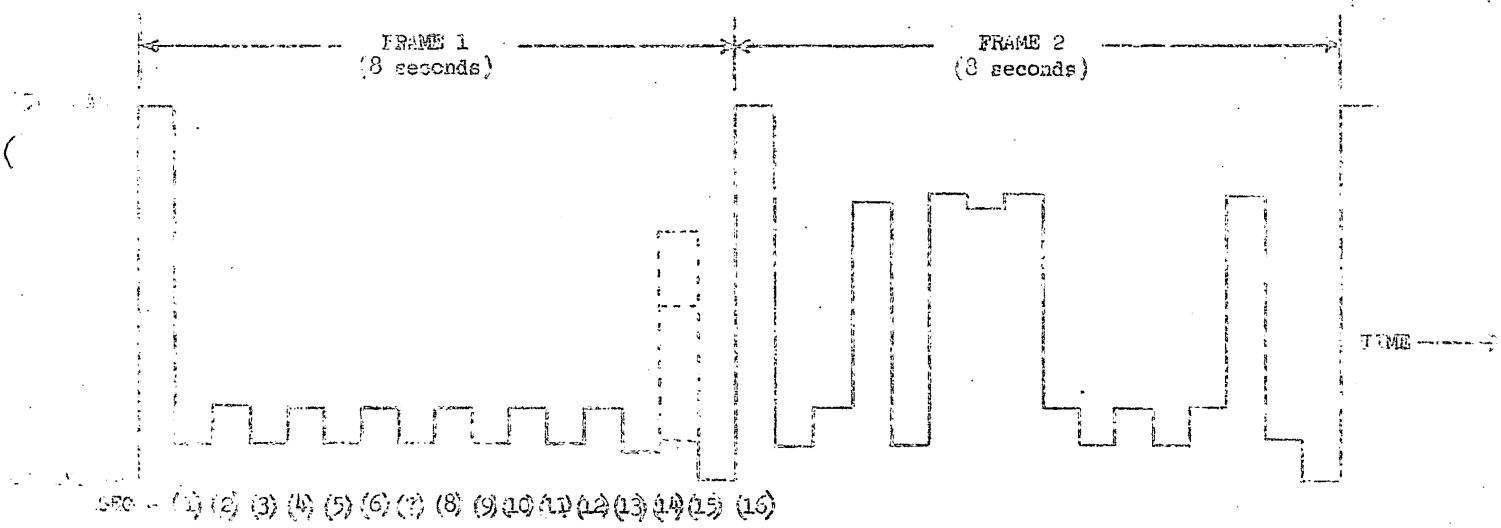
D.L. CHANNEL T.M. FORMAT



FRAME 1 shows all DL systems OFF. The dotted lines on segment 14 indicate the MID AND HIGH positions for this segment.

FRAME 2 shows DL systems 3, 5, 6 and 7 ON and the payload EXECUTED. All other segments are LOW indicating their respective systems are OFF.

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BAND #	7105A	7105B	7105C	7105D
1.	P n2 153½ - 165	P n2 154 - 165	P n1 100½ - 124	S n2 1790 - 2520
2.	P n1 166 - 200	P n1 166 - 200	P n2 196 - 350	S n1 4920 - 5080
3.	S n1 550 - 650	S n1 550- 651	P w2 350 - 550	S w2 6450 - 6725
4.	S w1 654 - 850	S w1 652- 857	S n2 1790 -2520	P n1 6720 - 7300
5.	S n2 820 - 920	S n2 820- 922	P w1 3600 -4055	P w1 7220 - 7930
6.	P w2 920 - 1108	T w1 2560-2705	S n1 4910 -5080	T w1 7730 - 8450*
7.	T w1 2580-2695	T w2 2675-2933	S w2 6460 -6710	T n2 8100 - 8620
8.	T w2 2678-2930	T n2 2915-3130	T w1 7080 -8510	T w2 8550 - 9320
9.	T n2 2915-3128	T n1 3102-3315	T n2 8090 -8630	T n1 9300 - 9515
10.	T n1 3105- 3315	P w1 3275-3615	T w2 8480 -9360	P n2 14.5 - 14.8 Gc
11.			T n1 9300 - 9520	P w2 196 - 553
12.			S w1 920 - 1855	S w1 920 - 1865

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