TMATS Basics

Everything you need to know in 30 minutes

References

- IRIG 106-19 Chapter 9 - https://www.wsmr.army.mil/RCCsite/Documents/106-19_Telemetry_Standards/Chapter9.pdf

- IRIG 124-19 TMATS Handbook https://www.wsmr.army.mil/RCCsite/Documents/124-19_TMATS_Handbook/124-19_TMATS_Handbook.pdf

Note: click cancel if username/password box appears

Groups

Identifier	Title
G	General Information
T	Transmission Attributes
R	Recorder-Reproducer Attributes
M	Multiplex/Modulation Attributes
P	PCM Format Attributes
D	PCM Measurement Description
B	Bus Data Attributes
S	Message Data Attributes
C	Data Conversion Attributes
H	Airborne Hardware Attributes
V	Vendor-Specific Attributes
X	TMATS eXtension Attributes

Structure
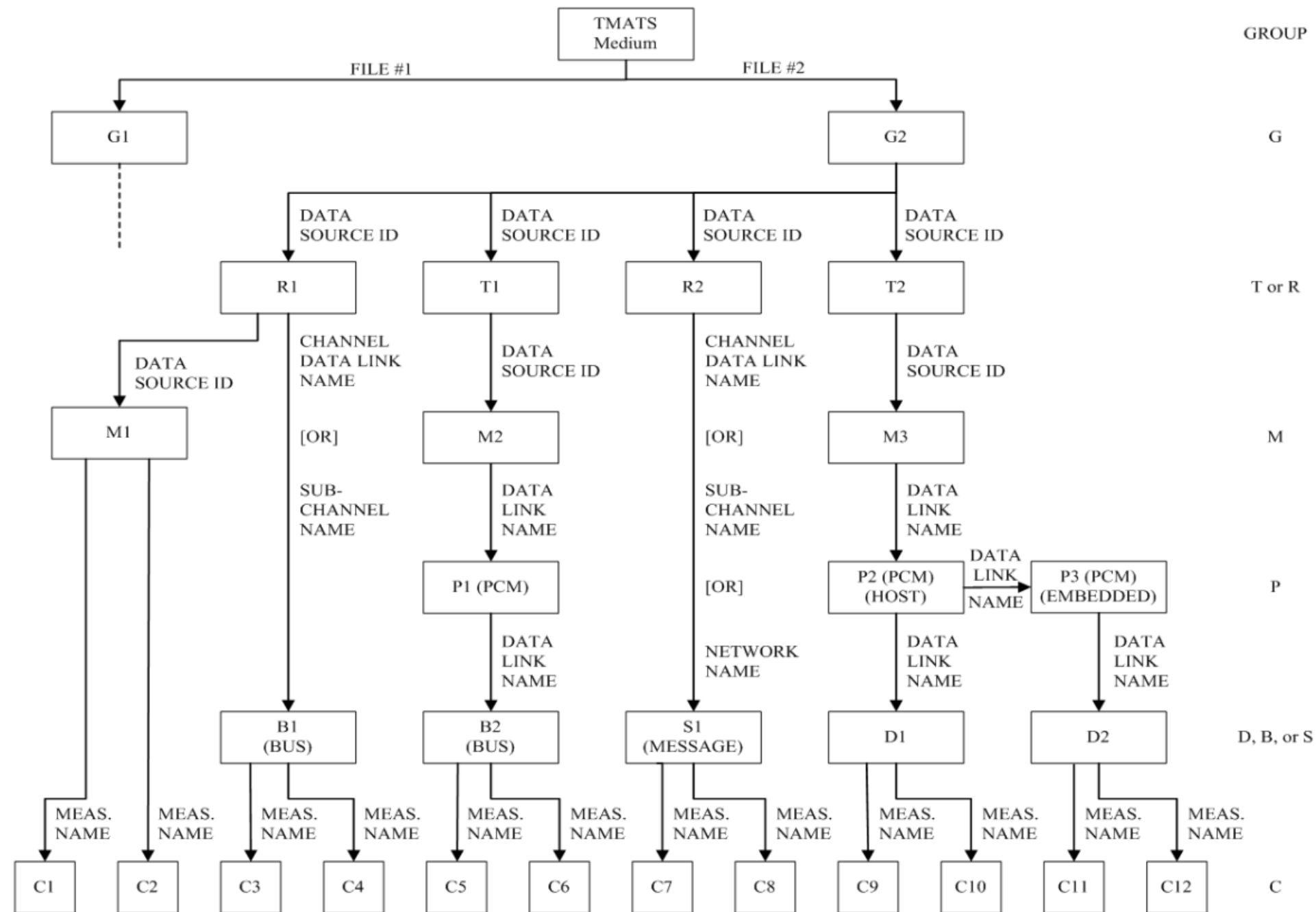
G Group

Figure 9-2. General Information Group (G)				Code Name
PROGRAM NAME - 9-10				(G\PN)
9-10	TEST ITEM			(G\TA)
	*Information			
		TMATS FILE NAME		(G\FN)
		RCC IRIG 106 REVISION LEVEL		(G\106)
		ORIGINATION DATE		(G\OD)
		REVISION NUMBER		(G\RN)
		REVISION DATE		(G\RD)
		UPDATE NUMBER		(G\UN)
		UPDATE DATE		(G\UD)
		TEST NUMBER		(G\TN)
		NUMBER OF POINTS OF CONTACT		(G\POC\N)
9-10		*Point of Contact		
			NAME	(G\POC1-n)
			AGENCY	(G\POC2-n)
			ADDRESS	(G\POC3-n)
			TELEPHONE	(G\POC4-n)
9-11	*Data Source Identification			
		NUMBER OF DATA SOURCES		(G\DSI\N)
			DATA SOURCE ID	(G\DSI-n)
			DATA SOURCE TYPE	(G\DST-n)
			DATA SOURCE SECURITY CLASSIFICATION	(G\DSC-n)
9-12	*Test Information			
		TEST DURATION		(G\TI1)
		PRE-TEST REQUIREMENT		(G\TI2)
		POST-TEST REQUIREMENT		(G\TI3)
		SECURITY CLASSIFICATION		(G\SC)
9-13	*TMATS Checksum			
		MESSAGE DIGEST/CHECKSUM		(G\SHA)
9-13	* Comments			
		COMMENTS		(G\COM)
*Heading Only - No Data Entry				

G Group Example

G\PN:PIT-PCM;
G\TA:PIT(15-001)P121;
G\106:09;
G\FN:C:\TMP\VM_121\D200F Recorder PCM1_PCM2.tmt;
G\DSI\N:1;
G\DSI-1:DATASOURCE;
G\DST-1:DRS;
G\OD:10-02-2018;
G\UD:09-18-2004;
G\POC\N:1;
G\POC1-1:ILIAD HeimRecorderGen;
G\COM:Generated by ILIAD Unit Generator build 802.17.0.184 on 2018/10/02 13:31:08;

M Group

Figure 9-5. Multiplex/Modulation Attributes Group (M)				Code Name
DATA SOURCE ID - 9-85				(M-x\ID)
9-85	***Composite Signal Structure**			
		SIGNAL STRUCTURE TYPE		(M-x\BB1)
		MODULATION SENSE		(M-x\BB2)
		COMPOSITE LPF BANDWIDTH		(M-x\BB3)
9-85	***Baseband Signal**			
		BASEBAND SIGNAL TYPE		(M-x\BSG1)
		*Low Pass Filter		
			BANDWIDTH	(M-x\BSF1)
			TYPE	(M-x\BSF2)
9-86		***Baseband Data Link Type**		
			*PCM	
	OR		DATA LINK NAME	(M-x\BB\DLN)
			*Analog	
			MEASUREMENT NAME	(M-x\BB\MN)
9-87	***Subcarriers**			
		NUMBER OF SUBCARRIERS		(M-x\SCO\N)
		*IRIG Subcarriers		
			NUMBER OF SCOs	(M-x\SI\N)
			SCO NUMBER	(M-x\SI1-n)
			SCO #n DATA TYPE	(M-x\SI2-n)
			MODULATION SENSE	(M-x\SI3-n)
9-87			***Low Pass Filter**	
			BANDWIDTH	(M-x\SIF1-n)
			TYPE	(M-x\SIF2-n)
9-88		***Data Link Type**		
			*PCM	

M Group Example

```
COMMENT:=============================================;
COMMENT:          PIT-PCM_1;
COMMENT:            PCM1;
COMMENT:=============================================;
M-1\ID:PCM1;
M-1\BSG1:PCM;
COMMENT:=============================================;
COMMENT:          PIT_WDAU,0,WDAU-2016-1;
COMMENT:            PCM1;
COMMENT:=============================================;
M-1\BB\DLN:PCM1;
```

P Group

Figure 9-6. PCM Format Attributes Group (P)				Code Name
DATA LINK NAME - 9-93				(P-d\DLN)
9-93	***Input Data**			
		PCM CODE		(P-d\D1)
		BIT RATE		(P-d\D2)
		ENCRYPTED		(P-d\D3)
		POLARITY		(P-d\D4)
		AUTO-POLARITY CORRECTION		(P-d\D5)
		DATA DIRECTION		(P-d\D6)
		DATA RANDOMIZED		(P-d\D7)
		RANDOMIZER LENGTH		(P-d\D8)
9-95	***Format**			
		TYPE FORMAT		(P-d\TF)
			COMMON WORD LENGTH	(P-d\F1)
			WORD TRANSFER ORDER	(P-d\F2)
			PARITY	(P-d\F3)
			PARITY TRANSFER ORDER	(P-d\F4)
			CRC	(P-d\CRC)
			CRC CHECK WORD STARTING BIT	(P-d\CRCCB)
			CRC DATA START BIT	(P-d\CRCDB)
			CRC DATA NUMBER OF BITS	(P-d\CRCDN)
9-97	***Minor Frame**			
		NUMBER OF MINOR FRAMES IN MAJOR FRAME		(P-d\MF\N)
			NUMBER OF WORDS IN A MINOR FRAME	(P-d\MF1)
			NUMBER OF BITS IN A MINOR FRAME	(P-d\MF2)
		SYNC TYPE		(P-d\MF3)
9-98		***Synchronization Pattern**		
			LENGTH	(P-d\MF4)
			PATTERN	(P-d\MF5)

P Group Example

P-1\DLN:PCM1;
P-1\D1:NRZ-L;
P-1\D2:1666666;
P-1\D4:N;
P-1\TF:ONE;
P-1\F1:16;
P-1\F2:M;
P-1\F3:NO;
P-1\MF\N:4;
P-1\MF1:13;
P-1\MF2:224;
P-1\MF3:FPT;
P-1\MF4:32;
P-1\MF5:00011111011101001110100101001001;
P-1\SYNC1:0;
P-1\SYNC2:0;
P-1\SYNC3:0;
P-1\SYNC4:0;
P-1\ISF\N:1;

Linkage

Table 9-6.   PCM Format Attributes Group (P)

Parameter	Code Name	Usage Attributes
DATA LINK NAME	P-d\DLN	R/R Ch 10 Status: RO
		Allowed when: defining PCM data
		Required when: Allowed
		Links from: M-x\BB\DLN, M-x\SI\DLN-n, R-x\CDLN, P-d\AEF\DLN-n, P-d\FSC2-n, P-d\ADM\DMN-n, R-x\EV\DLN-n
		Links to: D-x\DLN, B-d\DLN
		Range: 32 characters

- Is linked to from M, R, or P groups
- Links to either D or B group

D Group

Figure 9-7. PCM Measurement Description Group (D)	Code Name
DATA LINK NAME - 9-112	(D-x\DLN)
NUMBER OF MEASUREMENT LISTS	(D-x\ML\N)
MEASUREMENT LIST NAME	(D-x\MLN-y)
NUMBER OF MEASURANDS	(D-x\MN\N-y)
MEASUREMENT NAME	(D-x\MN-y-n)
PARITY	(D-x\MN1-y-n)
PARITY TRANSFER ORDER	(D-x\MN2-y-n)
MEASUREMENT TRANSFER ORDER	(D-x\MN3-y-n)
*Measurement Location	
MEASUREMENT LOCATION TYPE	(D-x\LT-y-n)
*Word And Frame	
SUBFRAME ID COUNTER NAME	(D-x\IDCN-y-n)
NUMBER OF MEASUREMENT LOCATIONS	(D-x\MML\N-y-n)
NUMBER OF FRAGMENTS	(D-x\MNF\N-y-n-m)
WORD POSITION	(D-x\WP-y-n-m-e)
WORD INTERVAL	(D-x\WI-y-n-m-e)
FRAME POSITION	(D-x\FP-y-n-m-e)
FRAME INTERVAL	(D-x\FI-y-n-m-e)
BIT MASK	(D-x\WFM-y-n-m-e)
FRAGMENT TRANSFER ORDER	(D-x\WFT-y-n-m-e)
FRAGMENT POSITION	(D-x\WFP-y-n-m-e)
*Simultaneous Sampling	
SAMPLING MODE	(D-x\SS-y-n)
SAMPLE ON	(D-x\SON-y-n)
SAMPLE ON MEASUREMENT NAME	(D-x\SMN-y-n)
NUMBER OF WORD FRAME SAMPLES	(D-x\SS\N-y-n)
SAMPLE ON WORD	(D-x\SS1-y-n-s)
SAMPLE ON FRAME	(D-x\SS2-y-n-s)

Page references in left margin: 9-112, 9-113, 9-114

D Group Example

D-1\DLN:PCM1;
D-1\ML\N:1;
D-1\MLN-1:PIT_WDAU;
D-1\MN\N-1:45;
D-1\MN-1-1:DAYS;
D-1\MN1-1-1:DE;
D-1\MN2-1-1:D;
D-1\MN3-1-1:M;
D-1\LT-1-1:SF;
D-1\SF1-1-1:14;
D-1\SF2-1-1:4;
D-1\SFM-1-1:0000000001111111;

D-1\MN-1-2:SFID1;
D-1\MN1-1-2:DE;
D-1\MN2-1-2:D;
D-1\MN3-1-2:M;
D-1\LT-1-2:MF;
D-1\MF-1-2:1;
D-1\MFM-1-2:FW;
D-1\MN-1-3:HIGH_TIME;
D-1\MN1-1-3:DE;
D-1\MN2-1-3:D;
D-1\MN3-1-3:M;
D-1\LT-1-3:SF;
D-1\SF1-1-3:14;
D-1\SF2-1-3:1;
D-1\SFM-1-3:FW;
D-1\MN-1-4:LOW_TIME;
D-1\MN1-1-4:DE;
D-1\MN2-1-4:D;
D-1\MN3-1-4:M;
D-1\LT-1-4:SF;
D-1\SF1-1-4:14;
D-1\SF2-1-4:2;
D-1\SFM-1-4:FW;

COMMENT:=================================;
COMMENT: SCD-608D-2-1-1;
COMMENT: 52318A;
COMMENT:=================================;
D-1\MN-1-6:52318A;
D-1\MN1-1-6:DE;
D-1\MN2-1-6:D;
D-1\MN3-1-6:M;
D-1\LT-1-6:SF;
D-1\SF1-1-6:4;
D-1\SF2-1-6:1;
D-1\SFM-1-6:FW;

B Group

Figure 9-8. Bus Data Attributes Group (B)	Code Name
DATA LINK NAME - 9-121	(B-x\DLN)
TEST ITEM	(B-x\TA)
BUS PARITY	(B-x\BP)
NUMBER OF BUSES	(B-x\NBS\N)
BUS NUMBER	(B-x\BID-i)
BUS NAME	(B-x\BNA-i)
BUS TYPE	(B-x\BT-i)
* User-Defined Words	
USER-DEFINED WORD 1 MEASUREMENT	(B-x\UMN1-i)
PARITY	(B-x\U1P-i)
PARITY TRANSFER ORDER	(B-x\U1PT-i)
BIT MASK	(B-x\U1M-i)
TRANSFER ORDER	(B-x\U1T-i)
USER-DEFINED WORD 2 MEASUREMENT	(B-x\UMN2-i)
PARITY	(B-x\U2P-i)
PARITY TRANSFER ORDER	(B-x\U2PT-i)
BIT MASK	(B-x\U2M-i)
TRANSFER ORDER	(B-x\U2T-i)
USER-DEFINED WORD 3 MEASUREMENT	(B-x\UMN3-i)
PARITY	(B-x\U3P-i)
PARITY TRANSFER ORDER	(B-x\U3PT-i)
BIT MASK	(B-x\U3M-i)
TRANSFER ORDER	(B-x\U3T-i)

B/R Group Example

R-1\DSI-2:F1;
R-1\TK1-2:2;
R-1\CHE-2:T;
R-1\CDT-2:1553IN;
R-1\TK4-2:2;
R-1\CDLN-2:F1;
R-1\BTF-2:1;
B-2\DLN:F1;
B-2\NBS\N:1;
B-2\BID-1:00000000;
B-2\BNA-1:F1;
B-2\BT-1:1553;

C Group

Figure 9-10. Data Conversion Attributes Group (C)	Code Name
MEASUREMENT NAME - 9-143	(C-d\DCN)
9-143 ***Transducer Information**	
TYPE	(C-d\TRD1)
MODEL NUMBER	(C-d\TRD2)
SERIAL NUMBER	(C-d\TRD3)
SECURITY CLASSIFICATION	(C-d\TRD4)
ORIGINATION DATE	(C-d\TRD5)
REVISION NUMBER	(C-d\TRD6)
ORIENTATION	(C-d\TRD7)
9-144 ***Point of Contact**	
NAME	(C-d\POC1)
AGENCY	(C-d\POC2)
ADDRESS	(C-d\POC3)
TELEPHONE	(C-d\POC4)
9-144 ***Measurand**	
DESCRIPTION	(C-d\MN1)
MEASUREMENT ALIAS	(C-d\MNA)
EXCITATION VOLTAGE	(C-d\MN2)
ENGINEERING UNITS	(C-d\MN3)
LINK TYPE	(C-d\MN4)
9-144 ***Telemetry Value Definition**	
BINARY FORMAT	(C-d\BFM)
*Floating Point	
FLOATING POINT FORMAT	(C-d\FPF)
*Bit Weight	
NUMBER OF BITS	(C-d\BWT\N)
BIT NUMBER	(C-d\BWTB-n)
BIT WEIGHT VALUE	(C-d\BWTV-n)

C Group Example

```
COMMENT:===============================================;
COMMENT:      DCN: MN1:   SCD-608D-2-1-1;
COMMENT:                  52318A;
COMMENT:===============================================;
C-6\DCN:52318A;
C-6\TRD1:Analog;
C-6\TRD5:05/05/15;
C-6\MNA:L VERT ACCEL;
C-6\MN1:52318A;
C-6\MN3:G;
C-6\BFM:UNS;
C-6\MOT3:65535;
C-6\MOT4:0;
C-6\COM:RAW SAMPLE;
C-6\DCT:COE;
C-6\CO\N:1;
C-6\CO:-10.3544289410518430;
C-6\CO-1:0.0003196816759300;
```