

3. Timecode transfer to and from Host computer (PC) via USB Interface:

3.1 General Timecode transfer PC <-> mif4 as

3.1.1 2-byte MTC Quarter Frame Message (MTC QFM):

	F1 0nnndddd	(s. MIDI Spec. p. 45)
3.1.1.1	nnn	Message type:
		0: Frame count LS nibble (frame start x)
		1: Frame count MS nibble
		2: Seconds count LS nibble
		3: Seconds count MS nibble
		4: Minutes count LS nibble (frame start x+1)
		5: Minutes count MS nibble
		6: Hours count LS nibble
		7: Hours count MS nibble and SMPTE type
3.1.1.2	dddd	4 bits of binary message data (MS/LS nibble)
3.1.1.2.1	FRAME COUNT:	
	MS LS	
	000 f ffff	fffff: Frame number (0..29)
3.1.1.2.2	SECONDS COUNT:	
	MS LS	
	00 ss ssss	ssssss: Seconds number (0..59)
3.1.1.2.3	MINUTES COUNT:	
	MS LS	
	00 mm mmmm	mmmmmm: Minutes number (0..59)
3.1.1.2.4	HOURS COUNT:	
	MS LS	
	0 tt h hhhh	hhhhh: Hours number (0..23)
		tt: Time Code Type:
		0: 24 FPS
		1: 25 FPS
		2: 30 FPS Drop-Frame (DF)
		3: 30 FPS Non-Drop

3.1.2 10-byte MTC Full Message (MTC FM):

	F0 7F 7F 01 01 hr mn sc fr F7	(s. MIDI Spec. p. 49)
3.1.2.1	hr	Hours and type
	0tthhhh	
		tt: Time Code Type:
		0: 24 FPS
		1: 25 FPS
		2: 30 FPS Drop-Frame (DF)
		3: 30 FPS Non-Drop
		hhhhh: Hours (0..23)
3.1.2.2	mn	00mmmmmm: Minutes (0..59)
3.1.2.3	sc	00ssssss: Seconds (0..59)
3.1.2.4	fr	000ffffff: frames (0..29)

3.2 Time code transfer **mif4** -> **PC**:

3.2.1 SOURCE: **LTC** (Lock Indication threshold < 100 uS)

3.2.1.1 Transfer as MTC QFM:

- valid LTC only at nominal PLAY speed

3.2.1.2 Transfer as MTC FM:

- valid TC read at LTC input outside nominal/reverse PLAY speed +/- 6 %
- valid LTC at nominal reverse PLAY speed
- last valid LTC detected on LTC input
- valid LTC as standing Timecode with nominal PLAY rate
- valid TC read at LTC input during Jog/Shuttle and Locate

3.2.2 SOURCE: **USB & MIDI** (Lock Indication threshold < 5 ms)

3.2.2.1 Transfer as MTC QFM:

- valid MTC at nominal PLAY speed

3.2.2.2 Transfer as MTC FM:

- last valid MTC QFM detected on USB or MIDI input (transition PLAY -> STOP)
- valid MTC FM on USB or MIDI Input

3.2.3 SOURCE: **GEN** (genlocked if valid video SYNC IN signal with matching frame rate)

3.2.3.1 Transfer as MTC QFM:

- GEN local PLAY at nominal PLAY speed
- GEN JAM SYNC mode from LTC input at nominal PLAY speed
- MMC PLAY command (s. MMC Spec. p. 20) at nominal PLAY speed
- MMC DEFERRED PLAY command (s. MMC Spec. p. 20)

3.2.3.2 Transfer as MTC FM:

- MMC STOP command (s. MMC Spec. p. 20)
- MMC LOCATE command (s. MMC Spec. p. 29)

3.2.4 Conclusion:

3.2.4.1 **MTC QFM** transfer, only if a **nominal forward PLAY** condition is achieved.

3.2.4.2 **MTC FM** transfer, if any motion transition **STOP->PLAY, PLAY->STOP, LOCATE, Standing TC**, etc. occur or if any other state with readable TC **other** than nominal Play is achieved.

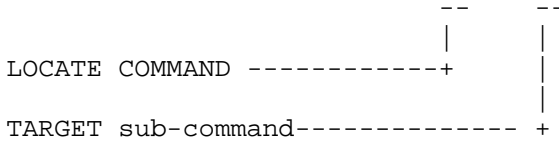
4. mif 4 GENERATOR remote control via MMC commands:

4.1 Set mif 4 GENERATOR Frame Rate and Time Code Start address

4.1.1 LOCATE:

Command:

F0 7F 7F 06 44 06 01 hr mn sc fr ff F7 (s. MMC Spec. p. 8 & 29)



4.1.1.1

hr
0tthhhh

Hours and type

tt: Time Code Type:
 0: 24 FPS
 1: 25 FPS
 2: 30 FPS Drop (DF)
 3: 30 FPS Non-Drop

hhhhh: Hours (0..23)

4.1.1.2

mn

00mmmmmm: Minutes (0..59)

4.1.1.3

sc

00ssssss: Seconds (0..59)

4.1.1.4

fr

000fffff: frames (0..29)

4.1.1.5

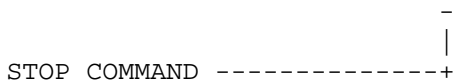
ff 0bbbbbbb: fractional frames
 (always 0)

4.2 Stop mif 4 GENERATOR at current location.

4.2.1 STOP:

Command:

F0 7F 7F 06 01 F7 (s. MMC Command p. 20)

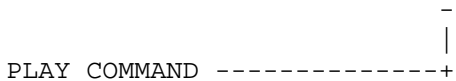


4.3 Start mif 4 GENERATOR at current location.

4.3.1 PLAY:

Command:

F0 7F 7F 06 02 F7 (s. MMC Command p. 20)

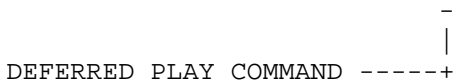


4.4 Start mif 4 GENERATOR at a predefined location defined by LOCATE command

4.4.1 DEFERRED PLAY:

Command:

F0 7F 7F 06 03 F7 (s. MMC Command p. 20)



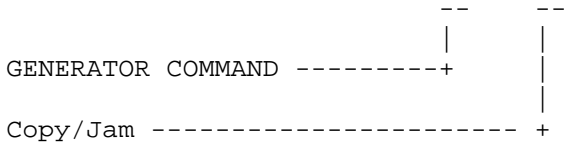
4.4.2 Identical to PLAY command, except when the device is currently locating to a target position, DEFERRED PLAY is delayed until LOCATE is achieved.

Additional **mif 4** commands in SW V1.2 (acc. to proposal for ROSENDAHL 2011-01-21):
 Firmware SW **V1.2** or later must be installed (s. mif 4 Manual p. 11)

5. Set JAM SYNC:
 (s. mif 4 Manual p. 8: JAM SYNC)

5.1 Command:

F0 7F 7F 06 4A 01 02 F7 (MMC Command p. 31)

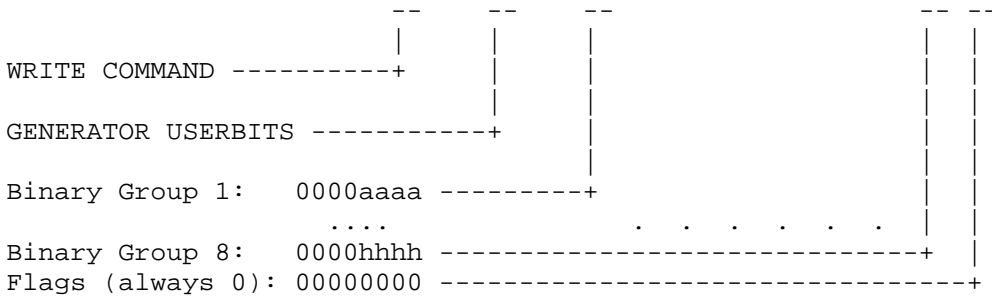


Get JAM SYNC status: (not used, since Generator always in "Time Code Jam" mode, s. MMC Spec. p. 68)

6. Set GENERATOR USERBITS:
 (s. mif 4 Manual S. 8: 5. GEN generator mode DISPLAY mode "**UB**")

6.1 Command:

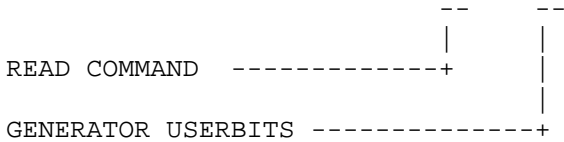
F0 7F 7F 06 40 0B 5D 09 u1 u2 u3 u4 u5 u6 u7 u8 u9 F7 (s. MMC p. 59)



7. Get GENERATOR USERBITS:
 (s. mif 4 Manual p. 8: 5. GEN generator mode DISPLAY mode "**UB**")

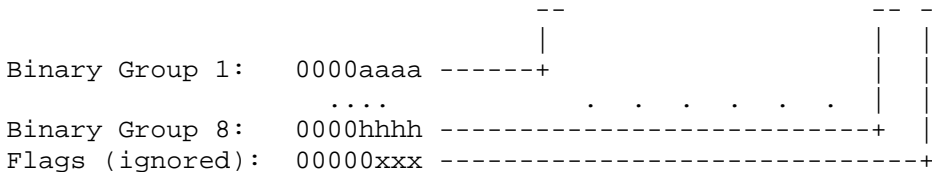
7.1 Command Request:

F0 7F 7F 06 42 02 5D 09 F7 (s. MMC spec. p. 59)



7.2 Command Response:

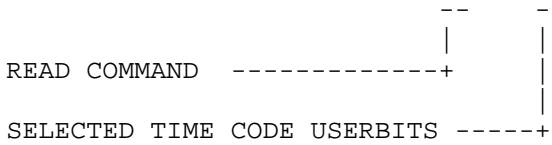
F0 7F 00 07 5D 09 u1 u2 u3 u4 u5 u6 u7 u8 u9 F7 (s. MMC p. 9)



8. Get SELECTED TIME CODE USERBITS:
 (s. mif 4 Manual p. 9: 6. DISPLAY modes "UB"):

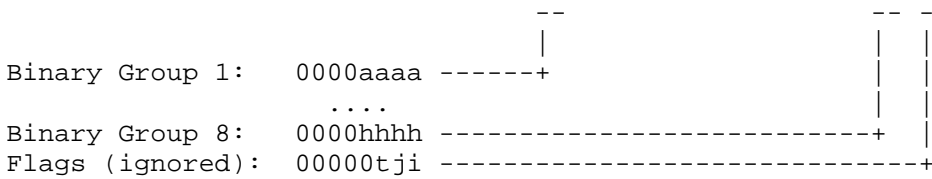
8.1 Command Request:

F0 7F 7F 06 42 02 47 09 F7 (MMC Command p. 56)



8.2 Command Response:

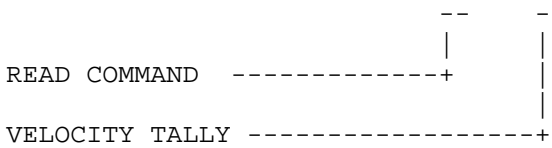
F0 7F 00 07 47 09 u1 u2 u3 u4 u5 u6 u7 u8 u9 F7 (s. MMC p. 9)



9. Get VELOCITY TALLY:
 (s. mif 4 Manual p. 9: DISPLAY modes "CAL")

9.1 Command Request:

F0 7F 7F 06 42 02 49 03 F7 (s. MMC Command p. 58)



9.2 Command Response:

F0 7F 00 07 49 03 sh sm sl F7 (s. MMC spec. p. 11)

