2.8
OPERATION WITH SERIAL INTERFACE

With today's version of the serial interface (1.810.751) the recorder can either be operated from a terminal (RS 232) or this feature can be used to save the audio parameters on tape or cassette.

The serial interface can be changed over between RS 232 connection and audio parameter transfer with the aid of code switches on the address board (SERIAL INTERFACE).

The future version of the serial interface (1.820.751) will also feature a STUDIO bus which is connected according to the SMPTE standard.

2.8.1
STUDIO Bus

The STUDIO bus is a data communications device through which individual pieces of equipment can be integrated into a flexible and powerful system (e.g. remote control of multiple tape recorders).

The serial interface 1.820.751 (in development) is a prerequisite for the STUDIO bus operation.
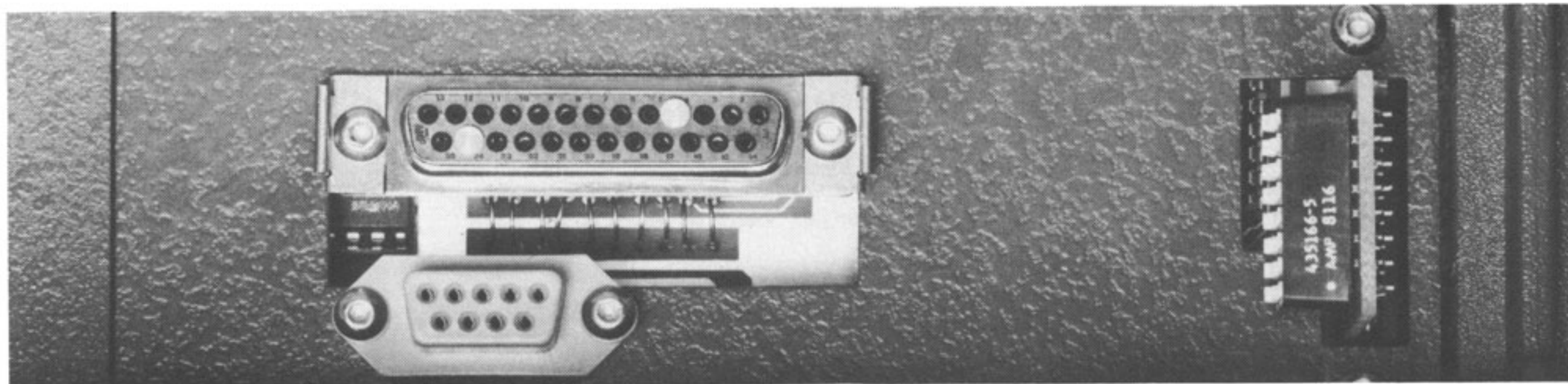
2.8.2.
Data protection

The audio parameters stored in RAM can be copied to a tape or cassette through the 9-pin remote control connector or new audio parameters can be loaded into the recorder (refer to Sections 4.2.7 and 4.2.8).

2.8.3
Serial interface RS 232

The RS 232 interface conforms to the EIA standard (Electronics Industry Association).
The tape recorder is normally set to a data rate of 9.6 kBaud. Data rates of 300 or 1200 Baud can be set with the aid of internal code switches (refer to Section 4.2.9).

A terminal with a corresponding interface can be connected to the RS 232 interface. The remote control functions of the recorder can be significantly enhanced with a terminal.

Procedure

Program serial interface according to 4.2.9.6 and 4.2.9.7.
Connect terminal (refer to Section 2.4.5).
Switch recorder on (the terminal can also be connected when the recorder is already under power).
The following message is displayed on the screen: * A810 *

The desired commands can now be entered from the terminal keyboard. Commands which comprise only 3 letters are typed in and released for execution by pressing the line advance key ("new line"). Commands consisting of characters and letters (e.g. REA 3) are executed as soon as the last digit has been entered. Depending on the type of terminal, commands can also be assigned to individual keys (so-called soft keys). This greatly simplifies the operation.

Instruction set

```
!==============================================================================!
!                     !                                              ! in soft !
!     Order           ! Meaning                                      ! -ware   !
!                     !                                              ! since   !
!==============================================================================!
!LCD                  ! Local keyboard disabled                      ! 46 82   !
!LCE                  ! Local keyboard enabled                       ! 46 82   !
!STP                  ! Stop                                         ! 46 82   !
!RWD                  ! Rewind                                       ! 46 82   !
!FWD                  ! Wind forward                                 ! 46 82   !
!PLY                  ! Play (reproduce)                             ! 46 82   !
!REC                  ! Record                                       ! 46 82   !
!TPL                  ! Tension loosely threaded tape ("tape load")  ! 46 82   !
!                     !                                              !         !
!LOC <address>        ! Locate to <(-)hh(:)( )(/)mm(:)( )(/)ss>       ! 46 82   !
!LMV <counter         ! Locate on move roll counter reading <xxxxxx>, !         !
!        reading>     ! (3 bytes HEX)                                ! 46 82   !
!STM <address>        ! Set tapetimer to <(-)hh(:)( )(/)mm(:)( )(/)ss>! 46 82   !
!                     !                                              !         !
!SHS                  ! Set higher capstan speed                     ! 46 82   !
!SLS                  ! Set lower capstan speed                      ! 46 82   !
!                     !                                              !         !
!SMN                  ! Set Mono/Stereo-switch to MONO               ! 46 82   !
!SST                  ! Set Mono/Stereo-switch to STEREO             ! 46 82   !
!                     !                                              !         !
!SNB                  ! Set equalization to NAB                      ! 46 82   !
!SCR                  ! Set equalization to CCIR                     ! 46 82   !
!                     !                                              !         !
!SVS                  ! Set VARISPEED mode                           ! 46 82   !
!CVS                  ! Clear VARISPEED mode                         ! 46 82   !
!                     !                                              !         !
!SRH                  ! Set REHEARSAL mode                           ! 46 82   !
!CRH                  ! Clear REHEARSAL mode                         ! 46 82   !
!                     !                                              !         !
!DST                  ! Display the status of the recorder on termi- !         !
!                     ! nal (clear with CNTL X); possible with       !         !
!                     ! MP UNIT 1.820.780 only!                      ! 13 83   !
!                     !                                              !         !
!REA {i}              ! Channel i READY           (i = 1, 2, or 3)   ! 46 82   !
!SAF {i}              ! Channel i SAFE            (i = 1, 2, or 3)    ! 46 82   !
!INP {i}              ! Channel i INPUT          (i = 1, 2, or 3)     ! 46 82   !
!SYN {i}              ! Channel i SYNC           (i = 1, 2, or 3)     ! 46 82   !
!REP {i}              ! Channel i REPRO          (i = 1, 2, or 3)     ! 46 82   !
!MTN {i}              ! Channel i MUTE              (i = 1 or 2)      ! 46 82   !
!MTF {i}              ! Channel i MUTE off          (i = 1 or 2)      ! 46 82   !
!                     !                                              !         !
!TON                  ! Time Code Delay on                           ! 46 82   !
!TDF                  ! Time Code Delay off (bypassed)               ! 46 82   !
!                     !                                              !         !
!                     ! CONTINUED ON NEXT PAGE                       !         !
!==============================================================================!
```

Instruction set (continued)

Order	Meaning	in soft -ware since
SAP \<i,j,k>	Set D/A converter \<j>, channel \<i>, to \<k> (i = 1 or 2; j = 0: LEVEL REPRO 1: TREBLE REPRO 2: BASS REPRO 3: EQUALISATION REPRO 4: LEVEL RECORD 5: TREBLE RECORD 6: BIAS 7: EQUALISATION RECORD; k = 2 digits HEX, corresponds to the two least significant digits of the counter display in audio adjust mode)	46 82
SCK \<time>	Set clock to \<hh(:)( )(/)mm(:)( )(/)ss>	46 82
ST?	Request for status	46 82
TM?	Request for tape counter	46 82
CL?	Request for clock	46 82
PR?	Request if pressure roller engageable (Y=yes, N=no)	46 82
CS?	Request if capstan sync (Y=sync, N=not sync)	46 82
NS?	Request for nominal speed (0 = 3.75 ips; 1 = 7.5 ips; 2 = 15 ips; 3 = 30 ips)	46 82
TH?	Request fir Time Code source (0 = left head; 1 = right head wide; 2 = right head narrow; 3 = Line Input)	46 82
MV?	Request for move roll counter reading (3 Bytes HEX)	46 82
AP? \<i,j>	Request for audio parameters channel \<i>, D/A converter \<j> (i = 1 or 2; j = 0: LEVEL REPRO 1: TREBLE REPRO 2: BASS REPRO 3: EQUALISATION REPRO 4: LEVEL RECORD 5: TREBLE RECORD 6: BIAS 7: EQUALISATION RECORD; Recorder replies with 2 digit HEX number)	46 82
	SPECIAL ORDERS:	
D 108 26E	Display RAM content on terminal (see examples)	46 82
UAP \<HEX Addr, Data>	Update audio parameters (see examples)	46 82
P 108 26E	Display RAM content on terminal in MOTOROLA EXORCISER format (see examples)	46 82
L	Reload audio parameters from terminal in MOTOROLA EXORCISER format	46 82

The above list of orders is not complete and will be enlarged as re-quired.

Examples:

FWD   = Fast forward

LOC -01:43:00 = Autolocator to Address - 1.43.00

SAF 3   = Time code channnel SAFE (recording inhibited)

AP? 1 4 XX   = Request for audio parameters channel 1, D/A converter 4
                    (LEVEL RECORD); XX = hexadecimal reply of the recorder
                    (e.g. A9)

SAP 1 4 A3   = Set audio parameters channel 1, D/A converter 4 (LEVEL
                    RECORD); new value A3 (old value A9 from the foregoing
                    example will be overwritten!)
                    CAUTION !!! All other parameters such as SYNC or REPRO,
                    tape speed, tape type, equalisation, must be selected
                    at the recorder itself.

D 108 26E   = All audio parameters are displayed on the terminal in
                    hexadecimal format, e.g.:

```
     0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
0100 xx xx xx xx xx xx xx xx 82 70 90 95 26 B0 30 BB   ...'.........&00;
0110 00 00 00 00 66 39 80 87 30 A0 3E 75 62 50 96 87   .....9..0 >..P..
0120 66 39 80 61 .. .. .. .. .. ..
C130 .. .. .. .. .. ..
.... .. ..
....
```

The address of a parameter can be computed as a decimal value by means
of the formula below (and must be subsequently translated to a hexa-
decimal value!):

RADR = ARAM-12 + IDAC + ISYNC*8 + CCAB*12 + SPEED*24 + CHNL*72 +
       TAPE*144

whereby:
    RADR   = Address of the parameter (in decimal form)
    ARAM   = 264 (108 hex), start address of parameter range in the RAM
    IDAC   = 0 for LEVEL REPRO
           = 1 for TREBLE REPRO
           = 2 for BASS REPRO
           = 3 for EQUALISATION REPRO
           = 4 for LEVEL RECORD
           = 5 for TREBLE RECORD
           = 6 for BIAS RECORD
           = 7 for EQUALISATION RECORD
    ISYNC = 0 for REPRO MODE
           = 1 for SYNC MODE
    CCAB   = 0 for CCIR equalization (automatically = 0 @ 30 ips)
           = 1 for NAB equalizaton (automatically = 1 @ 3.75 ips)
    SPEED = 0 for 3.75 ips (9.5 cm/s)
           = 1 for 7.5 ips (19 cm/s)
           = 2 for 15 ips (38 cm/s)
           = 3 for 30 ips (76 cm/s)
    CHNL   = 0 for channel 1
           = 1 for channel 2
    TAPE   = 1 for tape sort A
           = 0 for tape sort B

The address of TREBLE REPRO, SYNC, NAB, 38 cm/s, channel 1,
tape sort A, is thus computed as follows:

    264-12 + 1 + 1*8 + 1*12 + 2*24 + 0*72 + 1*144 = 465 = 01D1 (hex)

UAP 01D1 5C   = Update above audio parameter to 5C

P 108 26E   = All audio parameters are displayed on the terminal in
                    hexadecimal form in the MOTOROLA EXORCISER format. This
                    format results in more reliable data transmission
                    because possible errors can be recognized from the
                    CHECKSUM.