Partners in Progress

ELCONTROL
Power in control

VIP SYSTEM 3 / VIP MK3

TECNICAL REFERENCE

PRELIMINARY

8 HOST COMPUTER

8.1 PROCEDURES FOR DIALOGUE WITH HOST COMPUTER

When programmed in Host Computer mode the VIP SYSTEM 3 is designed to dialogue by means of an ELCONTROL protocoll with a computer having MSDOS operative system and, obviously, which uses the same type of protocoll as the VIP SYS.3. The data are in in ASCII 7 bit format.
The dialogue takes place by means of the RS232 serial line which must be programmed as appropriate to make it compatible with the computer used.

8.1.1 Default programming

The default programming with which the instrument leaves the factory is:

Host Computer

9600 Baudes (keine höhere Baudrate verfügbar)

7 Data bits (8 bit ohne Vorteil)

1 Stop bit

E Parity Even (abschalten könnte Zeit sparen)

8.1.2 Types of commands

The instrument operates as a slave in relation to the host computer and awaits commands from the latter for all operations available.

The commands which the host computer may send can be divided into three separate groups:

1) Request for information

2) Transmission of programming data

3) Transmission of operative commands

Let's examine these in detail:

1) Request for information This is subdivided into :

1. Request for MEMORY PACK transfer (nicht verfügbar) ESC W

2. Request for programming data ESC R

- Request for all measurements — ESC M
- Request for a measures page. — ESC m<n>

2) Transmission of programming data subdivided into:

Instrument programming	ESC P
MEMORY PACK programming	ESC D

3) Transmission of operative commands subdivided into:

MEMORY PACK reset	CAN D
Energy meter reset	CAN C
Average and maximum power reset	CAN P
Alarms reset	CAN A
Local and remote printer reset	CAN T
General reset no clock	CAN G
Automatic print forcing	ESF F
Local programming lock-out command	ESC DC3
Local programming release command	ESC DC1
Interruption of command in progress	ESC A

8.2 ELCONTROL COMMUNICATIONS PROTOCOLL

The protocoll implemented is of the MASTER/SLAVE type in which the host computer is always the MASTER and the VIP.SYS3 is always the SLAVE.
Communication takes place through three types of messages : "COMMAND" messages, "SERVICE" messages and "STRING" messages.

8.2.1 COMMAND messages

The **"COMMAND"** messages are those which identify a procedure and are immediately executive:

ESC U = Request for MEMORY PACK transfer data

ESC R = Request for programming data

ESC M = Request for all measurements

ESC mn= Request for one measures page

ESC P = Instrument programming

ESC D = MEMORY PACK programming

ESC L = Start of manual MEMORY PACK survey

ESC F = Forcing of automatic print-outs

ESC DC3 = Lock-out of local programming

ESC DC1 = Release of local programming

ESC A = Abort command in progress

CAN D = Reset MEMORY PACK

CAN C = Reset energy meters

CAN P = Reset average and maximum powers

CAN A = Reset alarms

CAN T = Reset printer

CAN S = Stop survey in progress

CAN G = General reset no clock

The format of the "COMMAND" messages is in ASCII and is closed by CR LF . The record transmitted further to command ESC U is therefore: 1BH,55H,0DH,0AH ; The same rule also applies to all the other "COMMAND" messages.

8.2.2 The SERVICES messages

The "SERVICE" messages are those which permit synchronization, signalling of errors and the closure of a command. They are:

ESC O = Request for a "STRING" message/ end of file received correctly

ESC K = Record NOT received correctly

NACK 0 = Memory pack not present

NACK 1 = Survey in progress

NACK 2 = No survey carried out

NACK 3 = A record received without any command procedure in progress

NACK 4 = Extra "STRING" message received instead of 1 EOF

NACK 5 = Non-congruous record received

NACK 6 = MEMORY PACK not virgin

NACK 7 = BLACK BOX not present

NACK 8 = Page number requested not congruent

NACK 9 = TIME BAND not set

NACK A = All surveys are programmed

NACK B = MEMORY PACK full

The format of the "SERVICE" messages is in ASCII and it is closed by CR LF . The record transmitted further to command ESC O is therefore: 1BH,4FH,0DH,0AH ; The same rule also applies to all other "SERVICE" messages.

8.2.3 STRING messages

The "STRING" messages are those which allow the exchange of data bewteen the HOST and the SYS3. The format of the transmission record is similar to the INTEL format; it varies from INTEL only in the number of data on the start address. The data which make up the "STRING" message are all in ASCII format.

The rules which allow the formation and thus the interpretation of a "STRING" message are the following:

STRING of data to be transmitted = VOLT1000ff

1-Each individual value must be taken and transported to HEX format and each HEX semibyte must be transformed to the corresponding ASCII.

V= 56H -> semibyte lsb =6 in ASCII = 36H ,semibyte msb=5 in ASCII 35H ,therefore the letter V becomes 36H,35H
also andersherum als in .HEX- Dateien!

2- The RECORD MARK (:) is placed at the head of the string.

3- The number of data to be transmitted is calculated, naturally not including the control characters. This number is placed after the RECORD MARK

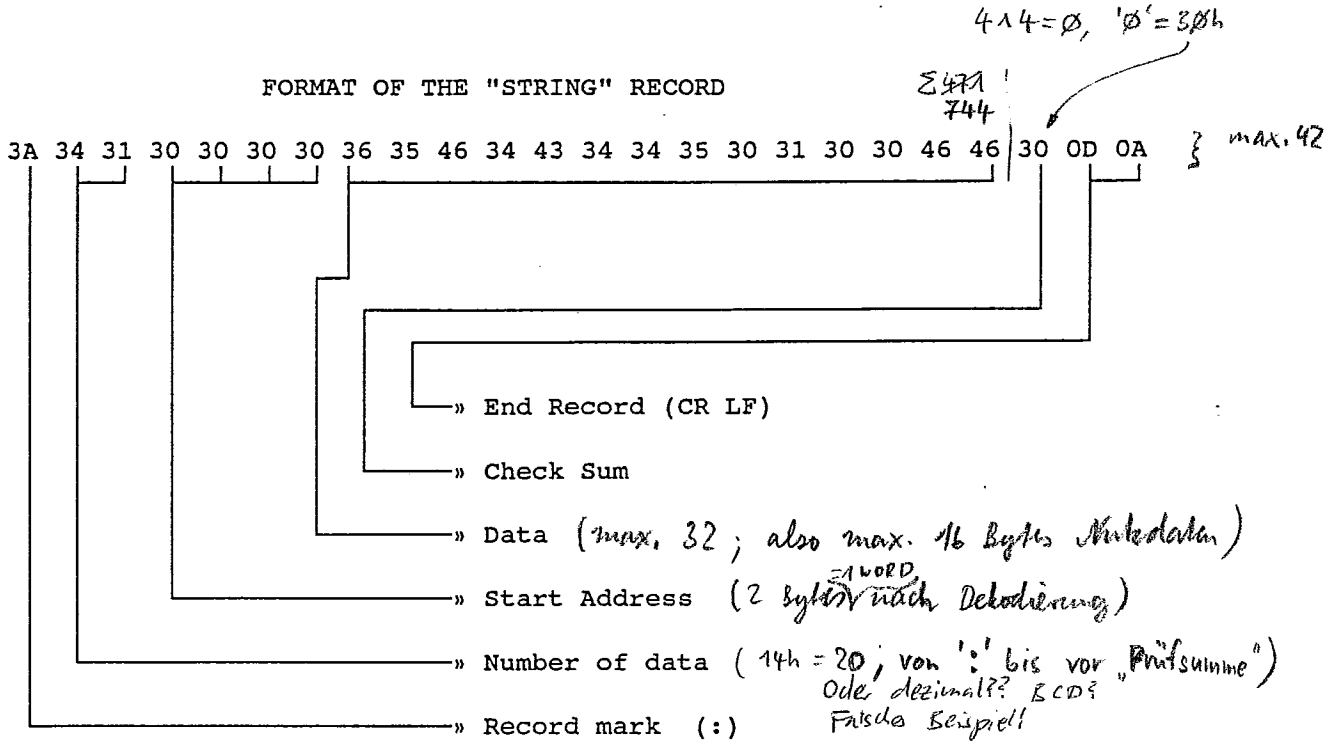
In the above example the number of data to be transmitted would be 14H, giving 34H,31H.

4- The Start Address is set = 30H,30H,30H,30H (for the first string). The Start Address is the consecutive number of the string transmitted (0000/FFFF), the 1st datum is the least significant in the string.
~sww. Block- oder Sequenz-Nummer

5- The bytes calculated as described in point 1 are then inserted in succession

6- The CHECK SUM byte is inserted; this is calculated as follows: all the data in the string are added up from the first character ':' to the last significant datum (8 bit sum without the carry); the EXCLUSIVE OR of the most significant semibyte with the least significant, and the least significant semibyte of the result is converted to ASCII.

7- The record is then closed : CR LF



The final record which closes the transmission block is as follows:

```
3A 30 30 30 30 30 31 45 0D 0A
```

where:

Record mark	=	3AH (:)
Number of data	=	30H 30H
Start Address	=	30H 30H 30H 31H
Check Sum	=	45H
End Record	=	0DH 0AH (CR LF)

For convenience this record will be called EOF from now on.

8.3 DIALOGUE SPECIFICATIONS

We have already analyzed the commands exchanged between the VIP SYS3 and the HOST and their exact definition, now let's look at the general rules governing the protocoll:

1- The Transmission/Reception RECORD is the name given to all the data closed by a CR LF. The RECORDs may be formally correct or incomplete; they are described as Correct if they correspond to the specifications given above, otherwise they will be Incomplete.

das ergibt beim STRING-Record ...

2- The maximum length of a Record must be 42 bytes. The reception of more bytes causes the SYS3 to transmit an ESC K immediately.

16 Byte Nutzdaten (nach Dekodierung)

3- The RS232 input data are ready by the SYS.3 and memorized in a reception buffer. In this phase only the error generated by the hardware device is analyzed (FRAMING ERROR, PARITY ERROR, OVERRUN ERROR). If an error is found, an ESC K is sent to the HOST COMPUTER. The record received is analyzed formally only when a CR LF is received.

4- On receipt of a "COMMAND" message if the message is complete and can be managed, the VIP SYS.3 replies by echoing the command itself; if the message is not formally correct the reply is ESC K. If the message correct but cannot be processed, the reply is NACK x (where x is the number of the error). ESC K taucht auch auf, wenn das Kommando noch nicht verarbeitet wurde!

5- On receipt of "STRING" messages and "SERVICE" messages the VIP SYS.3 replies in different ways; reference must therefore be made to the illustrated diagrams which follow.

6- When an error is found in the "SERVICE" record the attempt is repreated 3 times and the command is then aborted.

7- A reply must always be given to every "COMMAND", "SERVICE" or "STRING" message; the reply may be positive or negative but it must always be given. NEVER give two "COMMAND" messages without receiving a reply, even if the intention is to abort the procedure. If the communication is not successful reconnect using the procedure illustrated in point 8.

8- When the host and the SYS.3 are connected for the first time the following initialization procedure is required :
The Host sends an ESC A to the SYS3 and a 5 sec. timeout is started; if the SYS3 replies ESC A to the host then the operator can proceed to transmit the command - otherwise the procedure is restarted at the end of the timeout. This is carried out 3 times.

9- The VIP SYS.3 has no Timeout and therefore is always connected to the line; it will never decide independently to abort a command in progress unless it is switched off and back on.

8.4 REQUEST FOR MEMORY PACK TRANSFER

This is enabled only if the instrument is fitted with the MEMORY PACK and provides transfer of all the data included in the range for transfer.

Any survey in progress PREVENTS TRANSFER.

The range is sent from the HOST in string format.
The range is described as follows in the string:

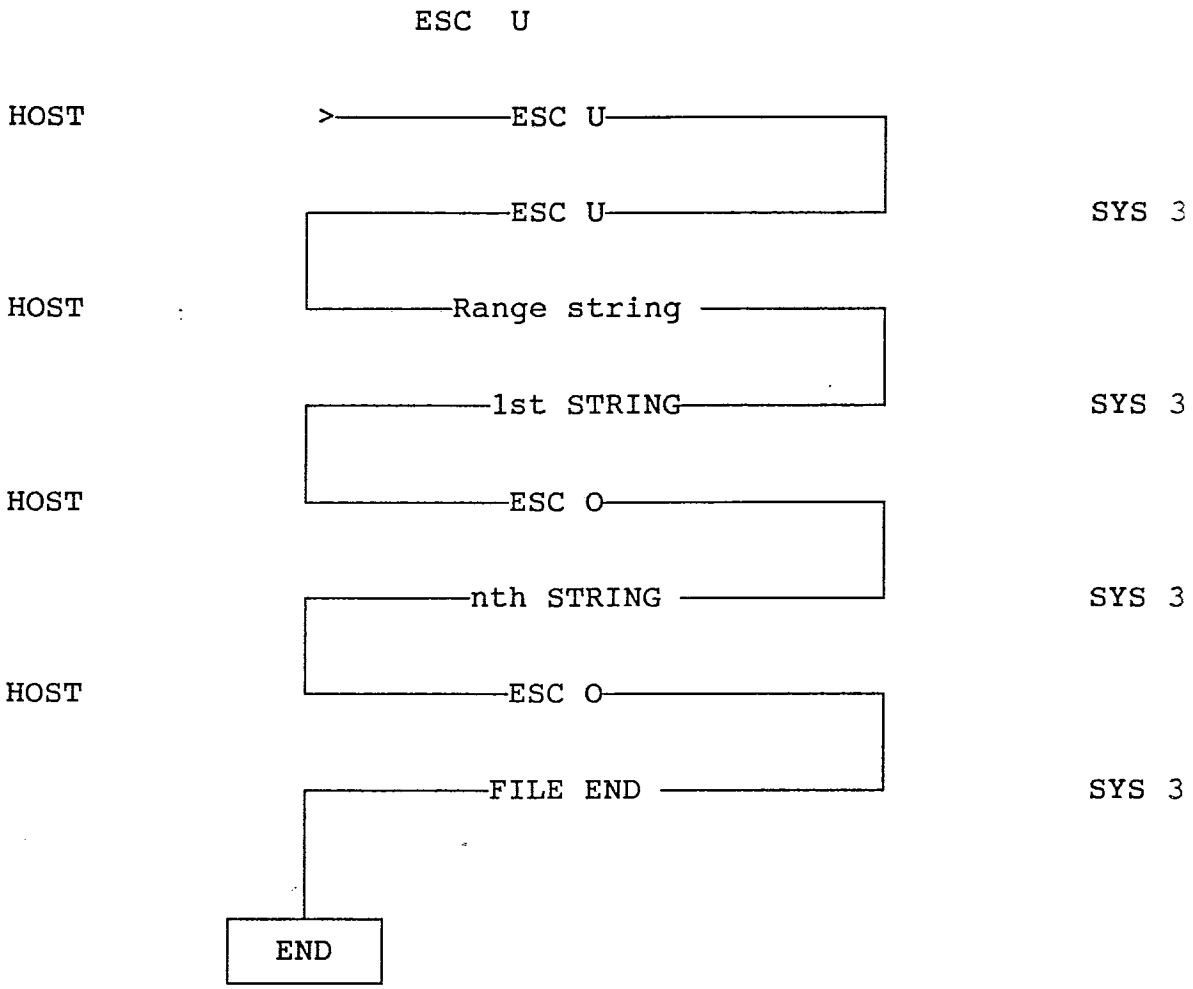
- initial add. (2 bytes lsb,msb) (0000/1FFF)
- initial add. bank (1 byte)
- add. of last datum for transfer (2 bytes lsb,msb) (0000/FFFF)
- bank of last datum add. (1 byte)

In MEMORY PACK transfer 16 significant data are always sent for each record (naturally, except for the last record which contains the number of data required to terminate the transmission).

In this case the Start Address of each string is not the number of the string but the true address of the data within the Memory Pack (0/128k --> 0/1FFFF).
It is therefore clear that it is not possible to represent the entire range in only 4 bytes, meaning that the least significant byte is excluded.

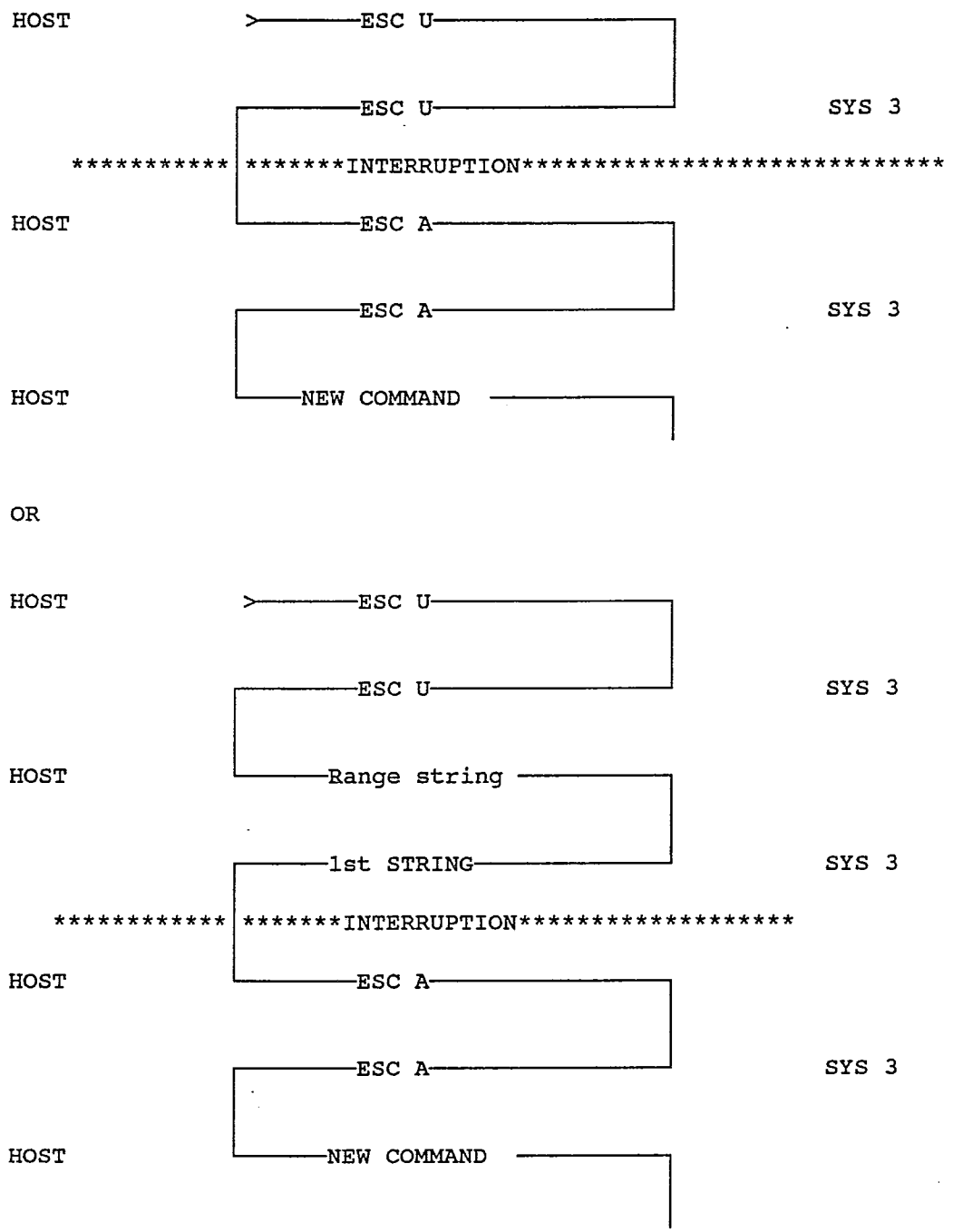
The transfer procedure is carried out in real time and in a complete transparent manner in relation to instrument operation.

8.4.1 Transmission protocoll

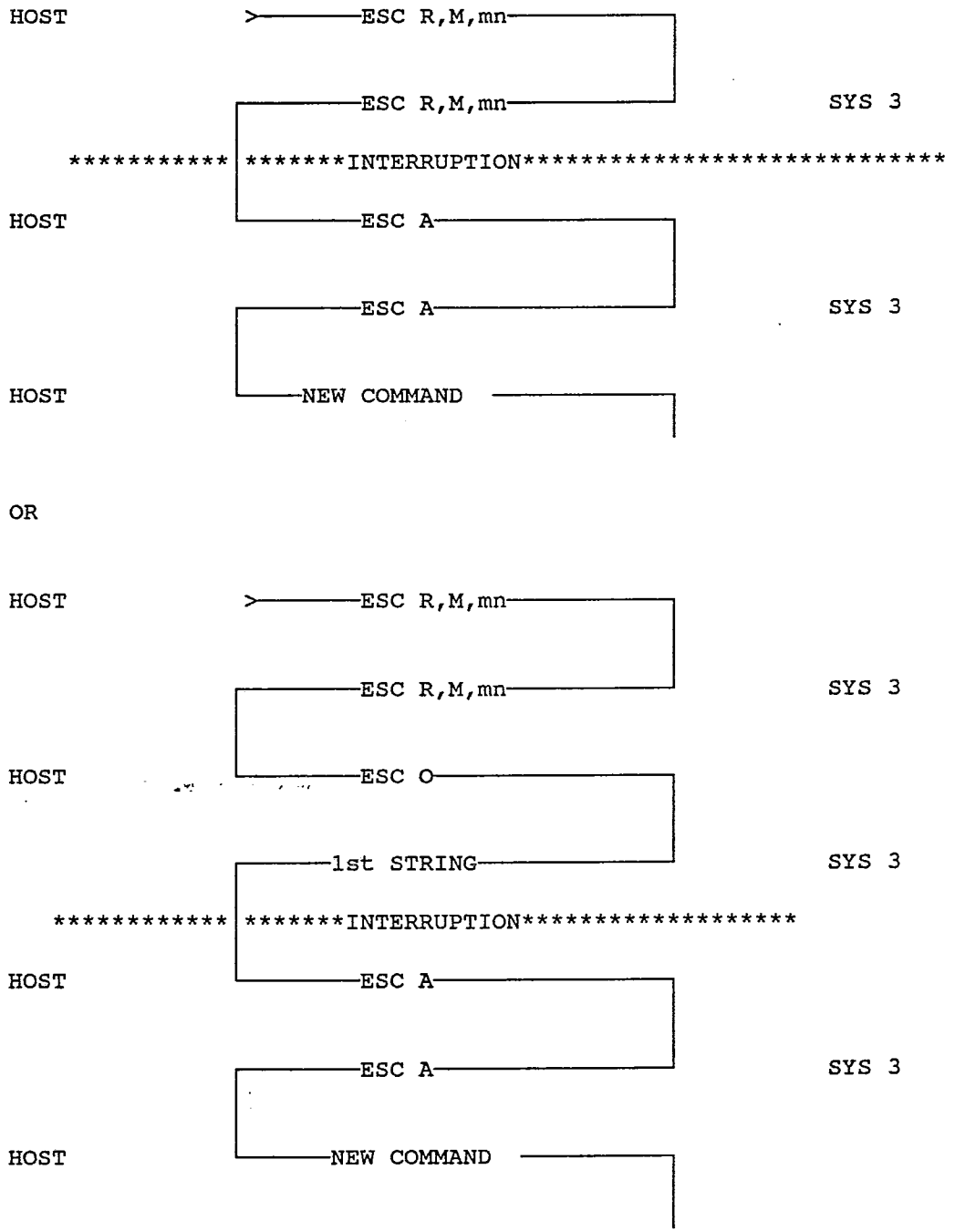


The data are memorized as received, in a file defined by the user.

8.4.2 ESC U interruption procedure



8.4.3 ESC R, M, mn interruption procedure



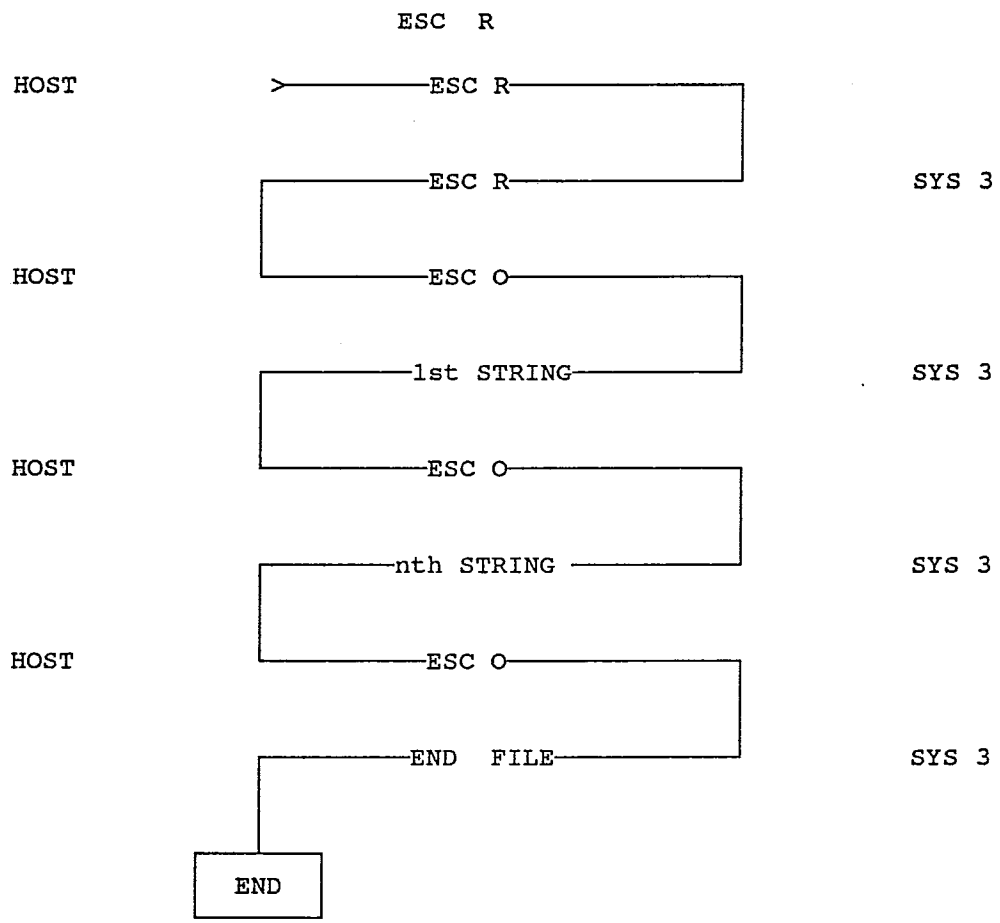
8.5 REQUEST FOR PROGRAMMING DATA

The VIP transmits all programming data which can be set or varied from the menu. This is a complete photograph of the instrument's programming status.

The transfer operation is carried out in real time. Since instrument programming requires a large quantity of data and it is not possible to provide a "photo" of the instrument in real time the following groups of logically homogeneous data are transmitted and copied:

- SET-UP data
- LANGUAGE selection
- LOCAL PRINTER programming
- PLOTTER 1 and 2 programming
- REMOTE PRINTER programming
- RELAY 1 and 2 programming
- ALARMS programming
- RESET code programming
- TIME BAND programming
- TIME ALARMS selection.

8.5.1 Transmission protocoll



8.5.2 Format of data transmitted:

Transmission of SET-UP data group and LANGUAGE selection

RECORD N.1

1 MODO		Programming mode Bit 0= 0 4W Bit 0= 1 3W Bit 1= 0 Low Voltage Bit 1= 1 Medium Voltage Bit 2= 0 Normal Bit 2= 1 Clamp meter inversion Bit 3= 0 No B.B Bit 3= 1 Black Box Bit 4= 0 No B.B with secondary program run Bit 4= 1 B.B with secondary program run Bit 5= 0 Pyrometer Bit 5= 1 LMA Bit 6= 0 Normal Bit 6= 1 Calibration Bit 7= Not used format HEX
2 COLLEG (LAYER+2)	.2 byte	Pointer for display of type of connection selected 4 WIRE ==> 03H,8AH 3 WIRE ==> 03H,0DEH
4 T.TENS. (LAYER+4)	2 "	Pointer for display of type of voltage selected LOW VOLTAGE ==> 04H,8AH MEDIUM VOLTAGE ==> 04H,DEH

RECORD N.2

1 KA (WSET)	6 Bytes	CURRENT FULL SCALE Format ASCII msb,lsb
7 KV (WSET+6)	6 Bytes	VOLTAGE FULL SCALE Format ASCII msb,lsb
13 cos0 (WSET+12)	4 Bytes	COS Φ SET Format ASCII msb,lsb

RECORD N.3

1	T.INTEG (WSET+16)	2 bytes	INTEGRATION TIME Format ASCII msb,lsb
3	T.STAMPA (WSET+18)	2 bytes	PRINT TIME Format ASCII msb,lsb
5	T.P.ALL (WSET+20)	2 bytes	ALARM PRINT TIME Format ASCII msb,lsb

RECORD N.4

1	DAY	*	
3	MONTH	*	
5	YEAR	*	CLOCK SET-UP
7	HOUR	*	
9	MINUTES	*	12 Bytes
11	SECONDS	*	
			Format ASCII msb,lsb

13	LINGUA	1 byte	Type of language selected 0 ==> Italian 1 ==> English 2 ==> German 3 ==> French format HEX
14	LAYER	2 "	Pointer for display of type of lang. Ital.==> 00H,82H Engl.==> 01H,95H Ger. ==> 02H,ACH Fren.==> 03H,0BFH

Transmission of LOCAL PRINTER programming data group

RECORD N.5

1	N.POSIZ. (BUFG)	1 byte	n. positions occupied	(00H/04H)
2	N.CONTAT (DECONT)	1 "	n. meters selected	(00H/02H)
3	N.GRAND. (DECONT+1)	1 "	n. other parameters selec.	(00H/04)
4	LAYER+6	8 "	Pointer for display of the 4 param. selected (see tab.1.0)	

RECORD N.6

1	STRADA	16 byte	*Pointer for display of path of *reverses for param. select. (see tab.1.1)	

RECORD N.7

1	STRADA+16	16 byte	*	

RECORD N.8

1	STRADA+32	16 byte	*	

RECORD N.9

1	STRADA+48	6 byte	*	
7	STRADO	1 "	bit 0: 1 ==> at least 1 parameter selected	
8	MEMORI	8 "	parameter selection buffer (see tab.1.2)	

Transmission of PLOTTER 1 programming data group

RECORD N.10

1	N.POSIZ. (BUFG+1)	1 byte	n. positions occupied	(00H/01H)
2	LAYER+16	2	"	Pointer for display of parameter selected (see tab.2.0)
3	STRADA+54	10 byte		*Pointer for display of path of *reverses for parameters selected. (see tab.2.1)

RECORD N.11

1	STRADA+64	16 byte	*	

RECORD N.12

1	STRADA+80	16 byte	*	

RECORD N.13

1	STRAD0	1 byte	*	bit 1: 1 ==> 1 parameter in PLOTTER 1 or PLOTTER 2 bit 2: 1 ==> 1 param. in PLOTTER 1
2	FIFO	2	"	parameter selection buffer (see tab. 2.2)
4	RANGE	1	"	Type of range set 31H ==> Automatic range 32H ==> Manual range
5	TCAMP	2	"	Sampling time (format ASCII)
7	BUFEXP	8	"	Exponent of every parameter available (see tab.2.3)
15	WPLOTT	2	"	* Plotter range in manual * selection (see tab.2.3)

RECORD N.14

1	WPLOTT+2	16 bytes	*	

```
                RECORD N.15

      1  WPLOTT+18 16 bytes *

                RECORD N.16

      1  WPLOTT+34 16 bytes *

                RECORD N.17

      1  WPLOTT+50 16 bytes *

                RECORD N.18

      1  WPLOTT+66 16 bytes *
```

Transmission of PLOTTER 2 programming data group

RECORD N.19

1	N.POSIZ. (BUFG+2)	1 byte		n. positions occupied (00H/01H)
2	LAYER+18	2	"	Pointer for display of parameter selected (see tab.3.0)
3	STRADA+96	10 byte		*Pointer for display of path of *reverses for parameters selected (see tab.3.1)

RECORD N.20

1	STRADA+106	16 byte	*	

RECORD N.21

1	STRADA+112	16 byte	*	

RECORD N.22

1	STRAD0	1 byte	*	bit 1: 1 ==> 1 parameter in PLOTTER 1 o PLOTTER 2 bit 3: 1 ==> 1 param. in PLOTTER 1
2	FIFO+2	2	"	parameter selection buffer (see tab. 3.2)
4	BUFEXP+8	8	"	Exponent of every parameter available (see tab.3.3)
12	WPLOTT+82	2	"	* Plotter range in manual * selection (see tab.3.3)

RECORD N.23

1	WPLOTT+84	16 bytes	*	

RECORD N.24

1	WPLOTT+100	16 bytes	*	

RECORD N.25

1	WPLOTT+116	16 bytes	*	

RECORD N.26

1 WPLOTT+132 16 bytes *

RECORD N.27

1 WPLOTT+148 16 bytes *

Transmission of REMOTE PRINTER programming data group

RECORD N.28

1	N.POSIZ. (BUFG+3)	1 byte	n. positions occupied	(00H/0DH)

2	LAYER+20	10	"	* Pointer for display of parameter * selected (see tab.4.0)

RECORD N.29

1	LAYER+30	16 byte	*

RECORD N.30

1	STRADA+138	16 byte	*Pointer for display of path of *reverses for parameters selected (see tab.4.1)

RECORD N.31

1	STRADA+154	16 byte	*

RECORD N.32

1	STRADA+170	16 byte	*

RECORD N.33

1	STRADA+186	6 byte	*

7	STRAD0	1	byte	bit 5,6: 1,1 ==> at least 1 param. for REMOTE PRINT-OUT bit 5,6: 0,0 ==> NO parameter for REMOTE PRINT-OUT

RECORD N.34

1	DRIVER	16 bytes		* parameter selection buffer * (see tab.4.2)

RECORD N.35

1	DRIVER+16	10 bytes	*

11	N.AR.EST (WTRONX)	3	"	Number of spaced characters (format ASCII)
14	N.CAR.COM.	3	"	Number of condensed characters

(WTRONX+3) (format ASCII)

RECORD N.36

1	SEQ.COMP	8 bytes	Condensing sequence (format ASCII)
9	SEQ.DECOM	8 "	Decondensation sequence (format ASCII)

RECORD N.37

1	ON SOTT.	8 bytes	Underlining activation sequence (format ASCII)
9	OFF SOTT.	8 bytes	Underlining disactivation sequence (format ASCII)

Transmission for RELAY 1 programming data group.

RECORD N.38

1	N.POSIZ. (BUFG+5)	1 byte		n. positions occupied (00H/01H)
2	LAYER+348	2	"	Pointer for display of parameter selected (see tab.5.0)
3	STRAD0	1	byte	bit 4 : 1 ==> 1 param. selected for RELAY 1 or RELAY 2
4	STRAD2	1	byte	bit 6 : 1 ==> 1 param. selected for RELAY 1
5	STRAD3	1	byte	bit 0 : 1 ==> Minimum alarm bit 1 : 1 ==> Maximum alarm
6	FIFO+4	2	bytes	parameter seleciton buffer (see tab.5.2)
8	FIFO+8	1	"	Type of alarm selec. for RELAY 1 0 ==> Minimum 1 ==> Maximum
9	STRADA+192	4	bytes	*Pointer for display of path of the *reverses for param. selected (see tab.5.1)

RECORD N.39

1	STRADA+196	16	bytes *

RECORD N.40

1	STRADA+212	16	bytes *

RECORD N.41

1	STRADA+228	16	bytes *

RECORD N.42

1	STRADA+244	16	bytes *

RECORD N.43

1	STRADA+260	16	bytes *

Transmission of RELAY 2 programming data group.

RECORD N.44

1	N.POSIZ. (BUFG+6)	1 byte	n. positions occupied	(00H/01H)
2	LAYER+350	2	"	Pointer for display of parameter selected (see tab.6.0)
3	STRAD0	1 byte		bit 4 : 1 ==> 1 parameter selected for RELAY 1 or RELAY 2
4	STRAD2	1 byte		bit 7 : 1 ==> 1 parameter selected for RELAY 2
5	STRAD3	1 byte		bit 2 : 1 ==> Minimum alarm bit 3 : 1 ==> Maximum alarm
6	FIFO+6	2 bytes		parameter selection buffer (see tab.6.2)
8	FIFO+9	1	"	Type of alarm selected on RELAY 1 0 ==> Minimum 1 ==> Maximum
9	STRADA+276	4 bytes		*Pointer for display of path of *reverses for selected parameters (see tab.6.1)

RECORD N.45

1	STRADA+280	16 bytes	*

RECORD N.46

1	STRADA+296	16 bytes	*

RECORD N.47

1	STRADA+312	16 bytes	*

RECORD N.48

1	STRADA+328	16 bytes	*

RECORD N.49

1	STRADA+344	16 bytes	*

Transmission of ALARM programming data group

RECORD N.50

```
1 LAYER+60   16 bytes * Pointer for display of parameter
                      * selected for Minimum Alarms
                      *  (see  tab.7.0)
```

RECORD N.51

```
1 LAYER+76   16 bytes *
```

RECORD N.52

```
1 LAYER+92   16 bytes *
```

RECORD N.53

```
1 LAYER+108  16 bytes *
```

RECORD N.54

```
1 LAYER+124  16 bytes *
```

RECORD N.55

```
1 LAYER+140  16 bytes *
```

RECORD N.56

```
1 LAYER+156  16 bytes * Pointer for display of parameter
                      * selected for Maximum Alarms
                      *  (see  tab.7.1)
```

RECORD N.57

```
1 LAYER+172  16 bytes *
```

RECORD N.58

```
1 LAYER+188  16 bytes *
```

RECORD N.59

```
1 LAYER+204  16 bytes *
```

RECORD N.60

```
1 LAYER+220  16 bytes *
```

RECORD N.61

```
     1 LAYER+236 16 bytes *
-------------------------------------------------------------
```

RECORD N.62

```
     1 LAYER+252 16 bytes * Pointer for display of parameter
                          * selected for Tariff Band Alarms
                          *  (vedi tab.7.2)
```

RECORD N.63

```
     1 LAYER+268 16 bytes *
```

RECORD N.64

```
     1 LAYER+284 16 bytes *
```

RECORD N.65

```
     1 LAYER+300 16 bytes *
```

RECORD N.66

```
     1 LAYER+316 16 bytes *
```

RECORD N.67

```
     1 LAYER+332 16 bytes *
-------------------------------------------------------------
```

RECORD N.68

```
     1 WALL1     16 bytes * Value of Minimum alarm set
                          * format ASCII msb,lsb (see  tab.7.0)
```

RECORD N.69

```
     1 WALL1+16  16 bytes *
```

RECORD N.70

```
     1 WALL1+32  16 bytes *
```

RECORD N.71

```
     1 WALL1+48  16 bytes *
```

RECORD N.72

```
     1 WALL1+64  16 bytes *
```

RECORD N.73

1 WALL1+80 16 bytes *

RECORD N.74

1 WALL1+96 16 bytes *

RECORD N.75

1 WALL1+112 16 bytes *

RECORD N.76

1 WALL1+128 16 bytes *

RECORD N.77

1 WALL1+144 16 bytes *

RECORD N.78

1 WALL1+160 16 bytes *

RECORD N.79

1 WALL1+176 16 bytes *

RECORD N.80

1 WALL1+192 14 bytes *

RECORD N.81

1 WALL2 16 bytes * Value of Maximum alarm set
* format ASCII msb,lsb (see tab.7.1)

RECORD N.82

1 WALL2+16 16 bytes *

RECORD N.83

1 WALL2+32 16 bytes *

RECORD N.84

1 WALL2+48 16 bytes *

RECORD N.85

1 WALL2+64 16 bytes *

RECORD N.86

1 WALL2+80 16 bytes *

RECORD N.87

1 WALL2+96 16 bytes *

RECORD N.88

1 WALL2+112 16 bytes *

RECORD N.89

1 WALL2+128 16 bytes *

RECORD N.90

1 WALL2+144 16 bytes *

RECORD N.91

1 WALL2+160 16 bytes *

RECORD N.92

1 WALL2+176 16 bytes *

RECORD N.93

1 WALL2+192 14 bytes *

RECORD N.94

1 BUFEXP+16 8 bytes Exponents select. for Minimum Alarms
format ASCII (see tab.7.0)

---

9 BUFEXP+24 8 bytes Exponents select. for Maximum Alarms
format ASCII (see tab.7.1)

RECORD N.95

1	BUFEXP+32	12 bytes	Exponents select. on Tariff Band alarms format ASCII (see tab.7.2)
13	BUFEXP+44	1 byte	Exponent select. for minimum alarms on AUX (see tab.7.0)
14	BUFEXP+45	1 byte	Exponent select. for maximum alarms on AUX (see tab.7.1)

RECORD N.96

1	WALL5	16 bytes *	Value of Tariff Band alarm * format ASCII (see tab.7.2)

RECORD N.97

1	WALL5+16	16 bytes *

RECORD N.98

1	WALL5+32	16 bytes *

RECORD N.99

1	WALL5+48	16 bytes *

RECORD N.100

1	WALL5+64	16 bytes *

RECORD N.101

1	WALL5+80	16 bytes *

RECORD N.102

1	WALL5+96	16 bytes *

RECORD N.103

1	WALL5+112	16 bytes *

RECORD N.104

1	WALL5+128	16 bytes *

RECORD N.105

1 WALL5+144 16 bytes *

RECORD N.106

1 WALL5+160 16 bytes *

RECORD N.107

1 WALL5+176 16 bytes *

RECORD N.108

1 TINS	2	bytes	Insensitivity time format ASCII (msb,lsb)

Transmission of programming data for RESET code

3 WRES+4	4	bytes	RESET code format ASCII (msb,lsb)

Transmission of TARIFF BAND programming data

7 FASCIE	1	byte	Flag of band programmed bit 0: 1 = band 1 bit 1: 1 = band 2 bit 2: 1 = band 3 bit 3: 1 = band 4 bit 4,5,6,7: 0,0,0,0 not oper.

Transmission of TIMED ALARMS programming data

RECORD N.109

1	WFUNZ	4 bytes	Start band 1: Hours Min. format ASCII (msb,lsb)
5	WFUNZ+4	4 bytes	End band 1: Hours Min. format ASCII (msb,lsb)
9	WFUNZ+8	4 bytes	Start band 2: Hours Min. format ASCII (msb,lsb)
13	WFUNZ+12	4 bytes	End band 2: Hours Min. format ASCII (msb,lsb)

RECORD N.110

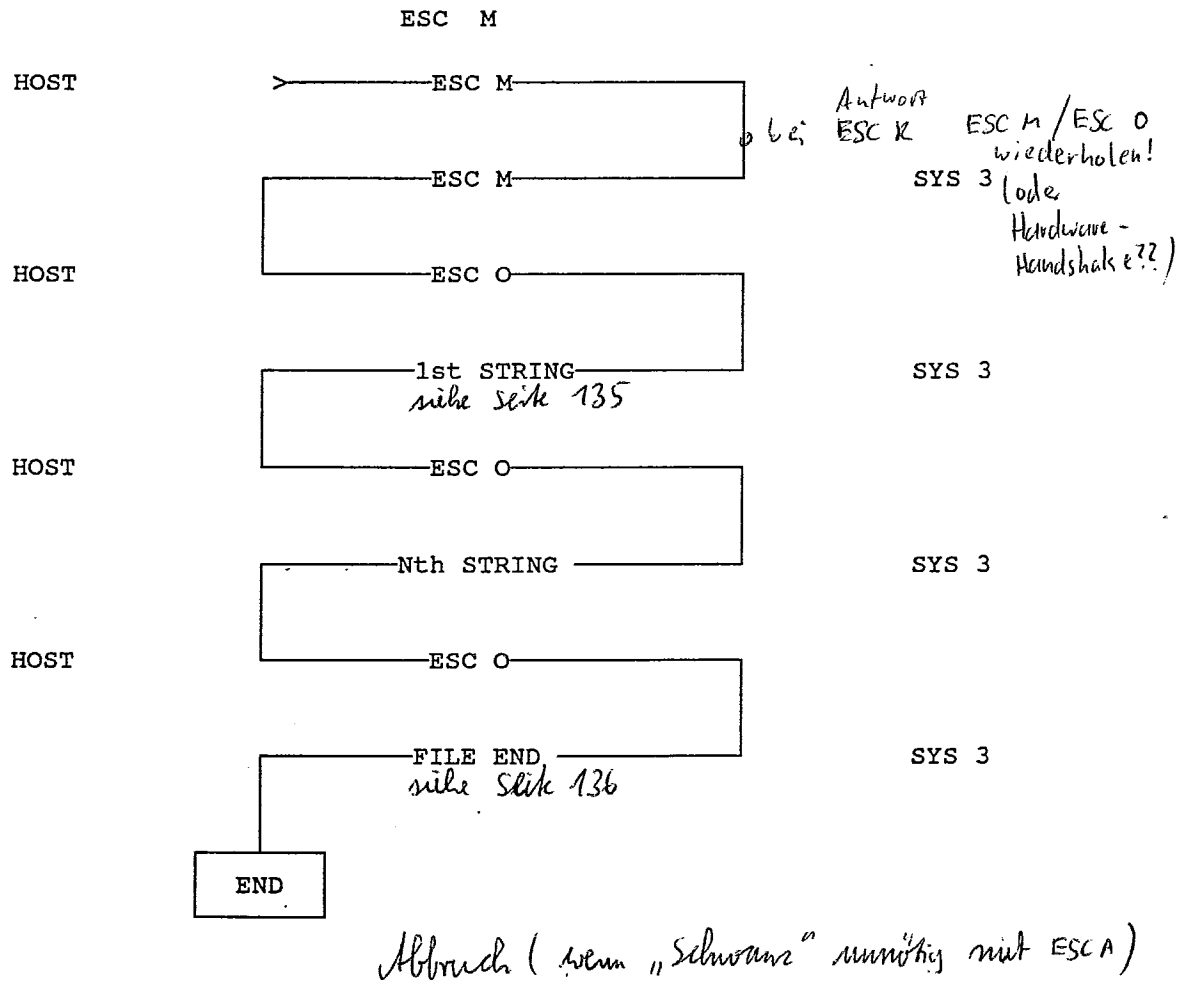
1	WFUNZ+16	4 bytes	Start band 3: Hours Min. format ASCII (msb,lsb)
5	WFUNZ+20	4 bytes	End band 3: Hours Min. format ASCII (msb,lsb)
9	WFUNZ+24	4 bytes	Start band 4: Hours Min. format ASCII (msb,lsb)
13	WFUNZ+28	4 bytes	End band 4: Hours Min. format ASCII (msb,lsb)

8.6 REQUEST FOR ALL MEASUREMENTS

The VIP transmits all the measurements which can be obtained by the instrument. This is a complete photograph equivalent to that which can be obtained by overall print-out.

The transfer procedure is carried out in real time and in a completely transparent way in relation to instrument operation.

8.6.1 Transmission Protocoll



RECORD N.1

1	FREQ		* fixed exponent = -2
2	FREQ		*

format HEX lsb,msb,exp compl. a 2

3	A-1	(3 byte)	Instantaneous current
6	A-2	"	
9	A-3	"	measurements
12	A-Σ	"	

format HEX lsb,msb,exp compl. a 2

RECORD N.2

1	A-N	"	

4	V-1	"	Instantaneous
7	V-2	"	voltage measurements
10	V-3	"	
13	V-Σ	"	

format HEX lsb,msb,exp compl. a 2

RECORD N.3

1	V-12	"	Concatenated voltages
4	V-23	(2 byte)	common exponent V-12
6	V-31	"	

format HEX lsb,msb,exp compl. a 2

8	KW-1	(3 byte)	
11	KW-2	"	Active powers

RECORD N.4

1	KW-3	"	
4	KW-Σ	"	

format HEX lsb,msb,exp compl. a 2

7	KW-1	"	
10	KW-2	"	Average active
13	KW-3	"	powers

RECORD N.5

1	KW-Σ	"	

format HEX lsb,msb,exp compl. a 2

4	KVA-1	"	
7	KVA-2	"	Instantaneous apparent
10	KVA-3	"	powers
13	KVA-Σ	"	

format HEX lsb,msb,exp compl. a 2

RECORD N.6

1	KVA-1	"	
4	KVA-2	"	Average apparent
7	KVA-3	"	powers
10	KVA-Σ	"	

format HEX lsb,msb,exp compl. a 2

13	KVAr-1	"	

RECORD N.7

1	KVAr-2	"	Instantaneous reactive
4	KVAr-3	"	powers
7	KVAr-Σ	"	

format HEX lsb,msb,exp compl. a 2

10	KVAr-1	"	
13	KVAr-2	"	Reactive powers

RECORD N.8

1	KVAr-3	"	averages
4	KVAr-Σ	"	

format HEX lsb,msb,exp compl. a 2

7	%-1	(2 byte)	fixed exponent = -2
9	%-2	"	Percentage harmonic
11	%-3	"	Distortions
13	%-Σ	"	

format HEX lsb,msb,exp compl. a 2

15	%-1	(2 byte)	fixed exponent = -2

RECORD N.9

1	%-2	"	Average percentage
3	%-3	"	Harmonic distortions
5	%-Σ	"	

format HEX lsb,msb,exp compl. a 2

7	CosΦ-1	"	fixed exponent = -3
9	CosΦ-2	"	Power factors
11	CosΦ-3	"	
13	CosΦ-Σ	"	

format HEX lsb,msb,exp compl. a 2

15	CosΦ-1	(2 byte)

RECORD N.10

1	CosΦ-2	"	Average power
3	CosΦ-3	"	factors
5	CosΦ-Σ	"	

format HEX lsb,msb,exp compl. a 2

7	Tg.Φ1	(3 byte)	
10	Tg.Φ2	"	Average tangents
13	Tg.Φ3	"	

RECORD N.11

1	Tg.$\Phi\Sigma$	"	

format HEX lsb,msb,exp compl. a 2

4	KWh-1	(9 byte)	Phase R active energy consumption

RECORD N.12

1	KVArh-1	"	Phase R reactive energy consumption

RECORD N.13

1	KWh-2	"	Phase S active energy consumption

RECORD N.14

1	KVArh-2	"	Phase S reactive energy consumption

RECORD N.15

1	KWh-3	"	Phase T active energy consumption

RECORD N.16

1	KVArh-3	"	Phase T reactive energy consumption

RECORD N.17

1	KWh-Σ	"	Phase Σ active energy consumption

RECORD N.18

1	KVArh-Σ	"	Phase Σ reactive energy consumption

format BCD packed msb,lsb

10	AUX	6 byte

RECORD N.19

12

1	KW-1 max	3 byte	Maximum active power
4	KW-2 max	"	
7	KW-3 max	"	
10	KW-Σ max	"	

RECORD N.20

12

1	KVA-1 max	"	Maximum apparent power
4	KVA-2 max	"	
7	KVA-3 max	"	
10	KVA-Σ max	"	

RECORD N.21

12

1	KVAr-1 max	"	Maximum reactive power
4	KVAr-2 max	"	
7	KVAr-3 max	"	
10	KVAr-Σ max	"	

RECORD N.22

8

1	%-1 max	(2 byte)	fixed exponent = -2
3	%-2 max	"	Maximum percentage
5	%-3 max	"	Harmonic distortions
7	%-Σ max	"	

≤ 274
Datenbytes

If at least one tariff band has been set, the following records are added:

RECORD 1 BAND 1

1	CosΦ-1	(2 byte)	
3	CosΦ-2	"	Average power
5	CosΦ-3	"	factors
7	CosΦ-Σ	"	

format HEX lsb,msb,exp compl. a 2

9	Tg.Φ1	(3 byte)	
12	Tg.Φ2	"	Average tangents

RECORD 2 BAND 1

1	Tg.Φ3	"	
4	Tg.ΦΣ	"	

format HEX lsb,msb,exp compl. a 2

---

7 KWh-1 (9 byte) Phase R active energy consumption

RECORD 3 BAND 1

1 KVArh-1 " Phase R reactive energy consumption

RECORD 4 BAND 1

1 KWh-2 " Phase S active energy consumption

RECORD 5 BAND 1

1 KVArh-2 " Phase S reactive energy consumption

RECORD 6 BAND 1

1 KWh-3 " Phase T active energy consumption

RECORD 7 BAND 1

1 KVArh-3 " Phase T reactive energy consumption

RECORD 8 BAND 1

1 KWh-Σ " Phase Σ active energy consumption

RECORD 9 BAND 1

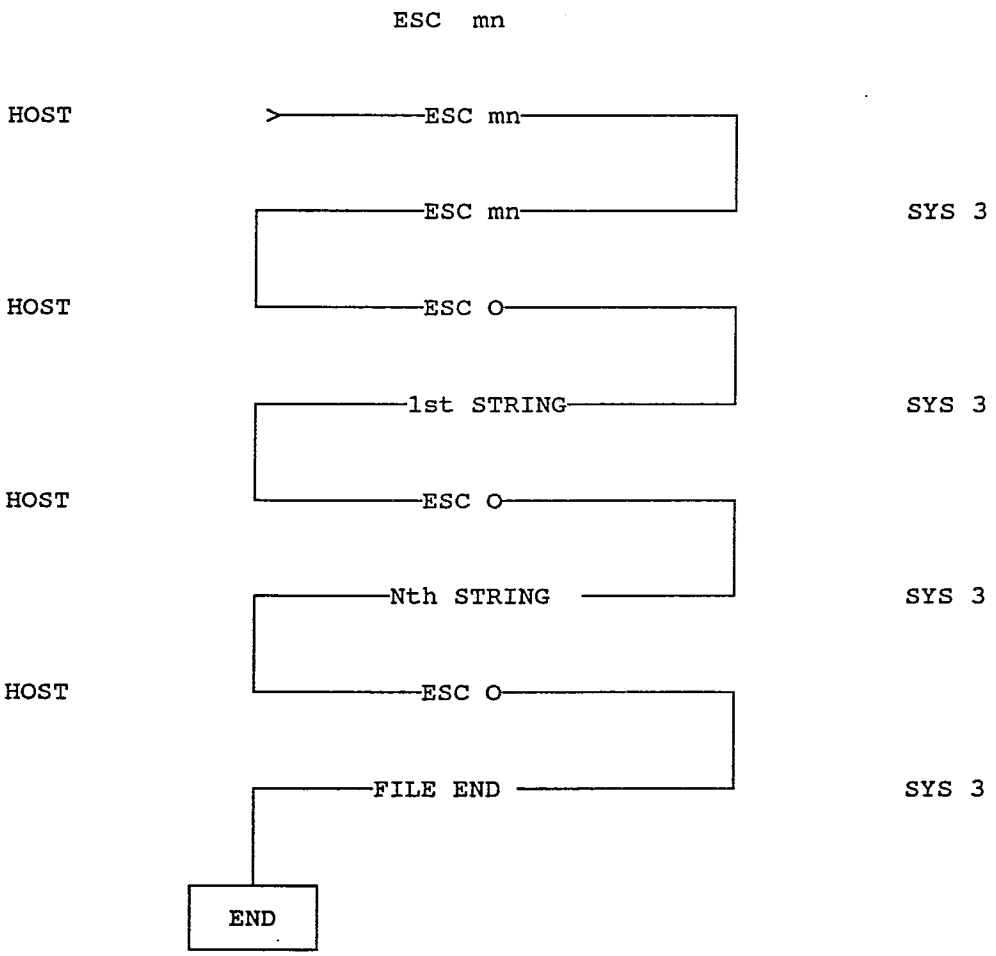
1 KVArh-Σ " Phase Σ reactive energy consumption
format ASCII msb,lsb

8.7 REQUEST FOR A MEASURES PAGE

The VIP transmits the measures relating to the display page whose number is contained in the request message.

The transfer procedure is carried out in real time and in a fully transparent manner in relation to instrument operation.

8.7.1 Transmission Protocoll



n= page number

8.7.2 Order of data transmitted for each page

Let's take a detailed look at the records for the various pages, remembering that the pages from 11 to 14 are available only if the time bands have been programmed and the black box pages will be programmed for each.

Pag.1 in reply to ESC m1

RECORD N.1

1	V-Σ * lsb		
2	V-Σ * msb		
3	V-Σ * exp		Instantaneous measures
4	A-Σ	(3 BYTE)	
7	KW-Σ	(3 BYTE)	
10	CosΦ-Σ	(2 BYTE)	fixed exponent = -3

Pag.2 in reply to ESC m2

RECORD N.1

1	V-1 * lsb		
2	V-1 * msb		
3	V-1 * exp		Instant measurements
4	A-1	(3 BYTE)	
7	KW-1	(3 BYTE)	
10	CosΦ-1	(2 BYTE)	fixed exponent = -3

Pag.3 in reply to ESC m3

RECORD N.1

1	V-2 * lsb		
2	V-2 * msb		
3	V-2 * exp		Instantaneous measures
4	A-2	(3 BYTE)	
7	KW-2	(3 BYTE)	
10	CosΦ-2	(2 BYTE)	fixed exponent = -3

Pag.4 in reply to ESC m4

RECORD N.1

1	V-3 * lsb		
2	V-3 * msb		
3	V-3 * exp		Instantaneous measures
4	A-3	(3 BYTE)	
7	KW-3	(3 BYTE)	
10	CosΦ-3	(2 BYTE)	fixed exponent = -3

Pag.5 in reply to ESC m5

RECORD N.1

1	V-12	(3 byte)	Concatenated voltages
4	V-23	(2 byte)	common exponent V-12
6	V-31	"	
8	A-N	(3 byte)	
11	FREQ		* fixed exponent = -2
12	FREQ		*

Pag.6 in reply to ESC m6

RECORD N.1

1	KW-1	(3 byte)	
4	KW-2	"	Active powers
7	KW-3	"	
10	KW-Σ	"	
13	KW-1	"	

RECORD N.2

1	KW-2	"	Average active
4	KW-3	"	powers
7	KW-Σ	"	
10	KW-1 max	"	Maximum active power
13	KW-2 max	"	

RECORD N.3

1	KW-3 max	"	Maximum active power
4	KW-Σ max	"	

Pag.7 in reply to ESC m7

RECORD N.1

1	KVA-1	"	
4	KVA-2	"	Instantaneous apparent
7	KVA-3	"	power
10	KVA-Σ	"	
13	KVA-1	"	

RECORD N.2

1	KVA-2	"	Average apparent
4	KVA-3	"	powers
7	KVA-Σ	"	
10	KVA-1	max "	Maximum apparent power
13	KVA-2	max "	

RECORD N.3

1	KVA-3	max "	
4	KVA-Σ	max "	Maximum apparent power

Pag.8 in reply to ESC m8

RECORD N.1

1	KVAr-1	"	
4	KVAr-2	"	Instantaneous active
7	KVAr-3	"	power
10	KVAr-Σ	"	
13	KVAr-1	"	

RECORD N.2

1	KVAr-2	"	Average reactive
4	KVAr-3	"	powers
7	KVAr-Σ	"	
10	KVAr-1	max "	Maximum reactive power
13	KVAr-2	max "	

RECORD N.3

1	KVAr-3	max "	
4	KVAr-Σ	max "	Maximum reactive power

Pag.9 in reply to ESC m9

RECORD N.1

1	%-1	(2 byte) fixed	exponent = -2
3	%-2	"	Percentage harmonic
5	%-3	"	Distortions
7	%-Σ	"	
9	%-1	(2 byte) fixed	exponent = -2
11	%-2	"	Average percentage
13	%-3	"	harmonic distortions
15	%-Σ	"	

RECORD N.2

1	%-1 max	(2 byte) fixed	exponent = -2
3	%-2 max	"	Maximum percentage
5	%-3 max	"	harmonic distortions
7	%-Σ max	"	

Pag.10 in reply to ESC m10 (10 --> 0AH converted to ASCII)

RECORD N.1

1	CosΦ-1	(2 byte)	
3	CosΦ-2	"	Average power
5	CosΦ-3	"	factors
7	CosΦ-Σ	"	

format HEX lsb,msb,exp compl. a 2

9	Tg.Φ1	(3 byte)	
12	Tg.Φ2	"	Average tangents

format HEX lsb,msb,exp compl. a 2

RECORD N.2

1	Tg.Φ3	"	
4	Tg.ΦΣ	"	

---

7 KWh-1 (9 byte) Phase R active energy consumption

RECORD N.3

1 KVArh-1 " Phase R reactive energy consumption

RECORD N.4

1 KWh-2 " Phase S active energy consumption

RECORD N.5

1 KVArh-2 " Phase S reactive energy consumption

RECORD N.6

1 KWh-3 " Phase T active energy consumption

RECORD N.7

1 KVArh-3 " Phase T reactive energy consumption

RECORD N.8

1 KWh-Σ " Phase Σ active energy consumption

RECORD N.9

1 KVArh-Σ " Phase Σ reactive energy consumption

The time-band record format transmitted is like that of the command requesting all measurements.

If a standard Black Box has been fitted the record format is the following:

Pag.15 in reply to ESC m15

RECORD N.1

1 AUX (3 byte) format HEX lsb,msb,exp
4 AUX2 "

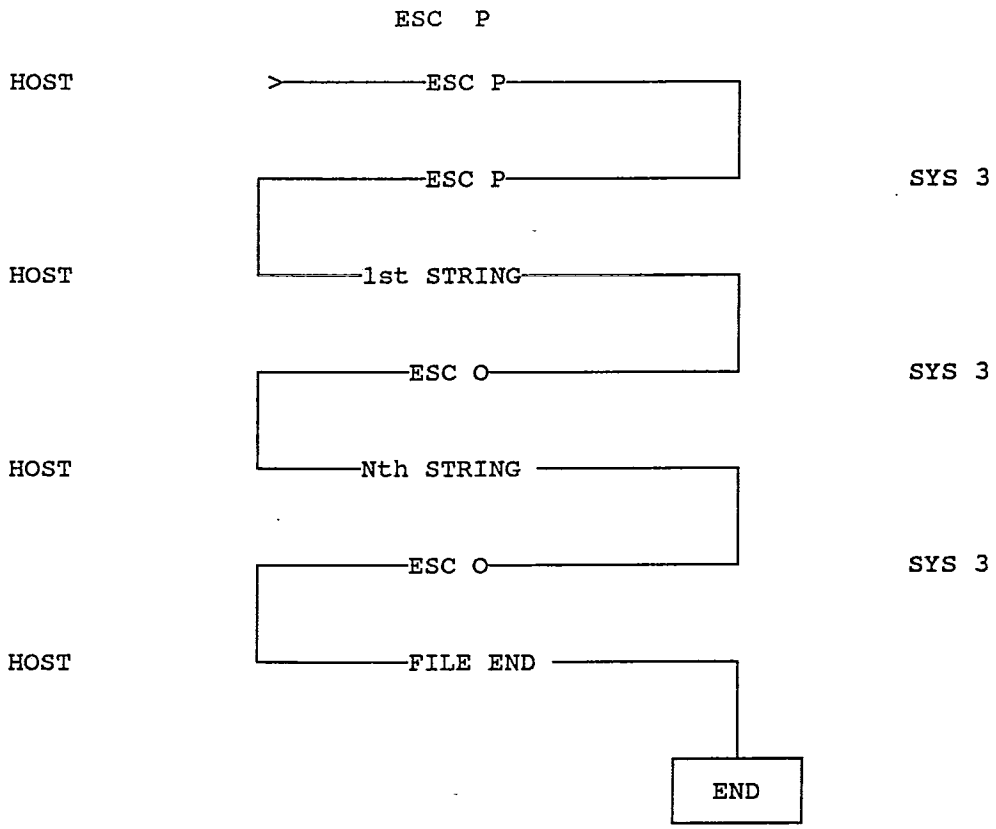
8.8 INSTRUMENT PROGRAMMING

The HOST transmits all the programming data which can be set or varied from the menu. This is a complete photograph of the instrument's programming status.

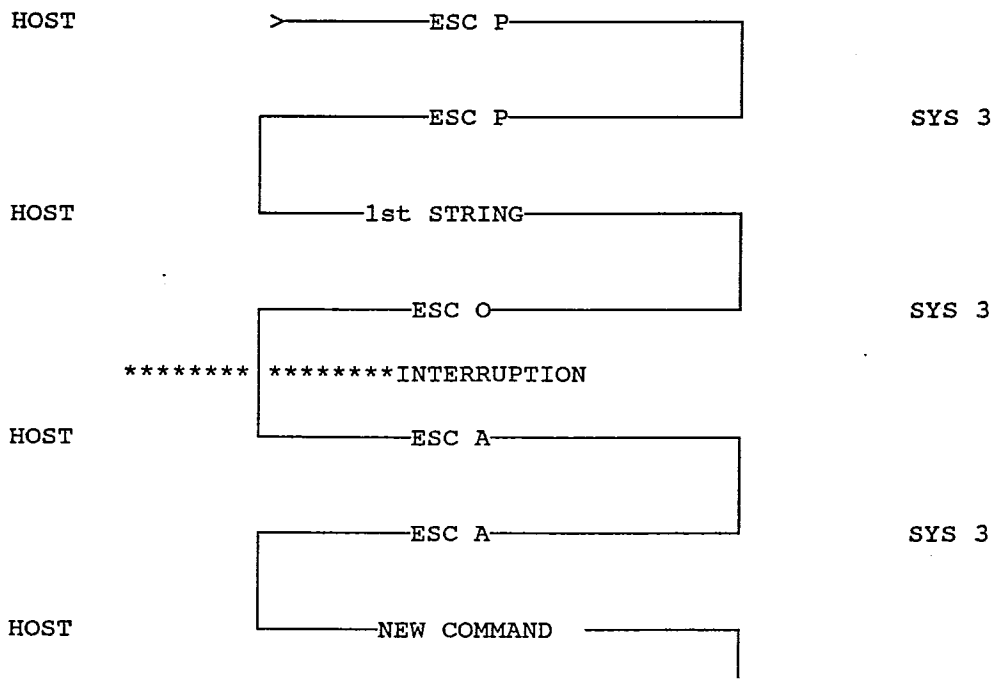
The transfor operation is carried out in real time.
The following groups of logically homogeneous data are transmitted:

- SET-UP data
- LANGUAGE selection
- LOCAL PRINTER programming
- PLOTTER 1 and 2 programming
- REMOTE PRINTER programming
- RELAY 1 and 2 programming
- ALARMS programming
- RESET code programming
- TIME BAND programming
- TIMED ALARMS selection.

8.8.1 Transmission protocoll



8.8.2 Interrupt procedure



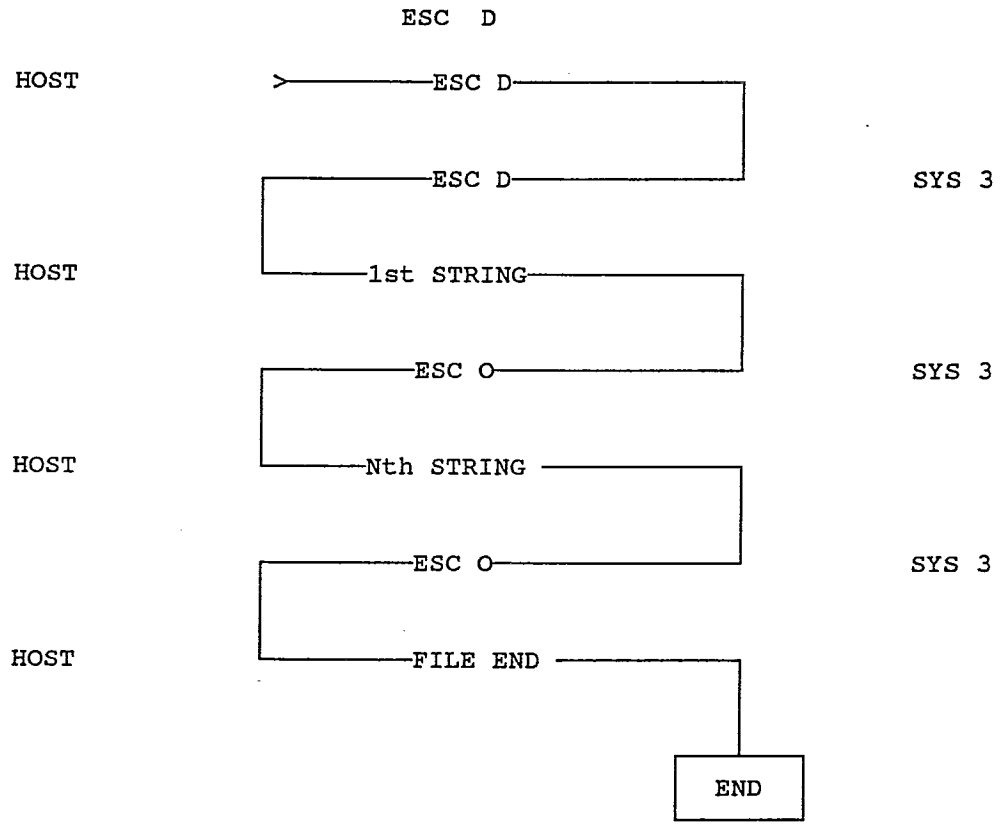
8.8.3 The formats of the records for transmission are the same as those in the REQUEST FOR PROGRAMMING DATA command

S,143

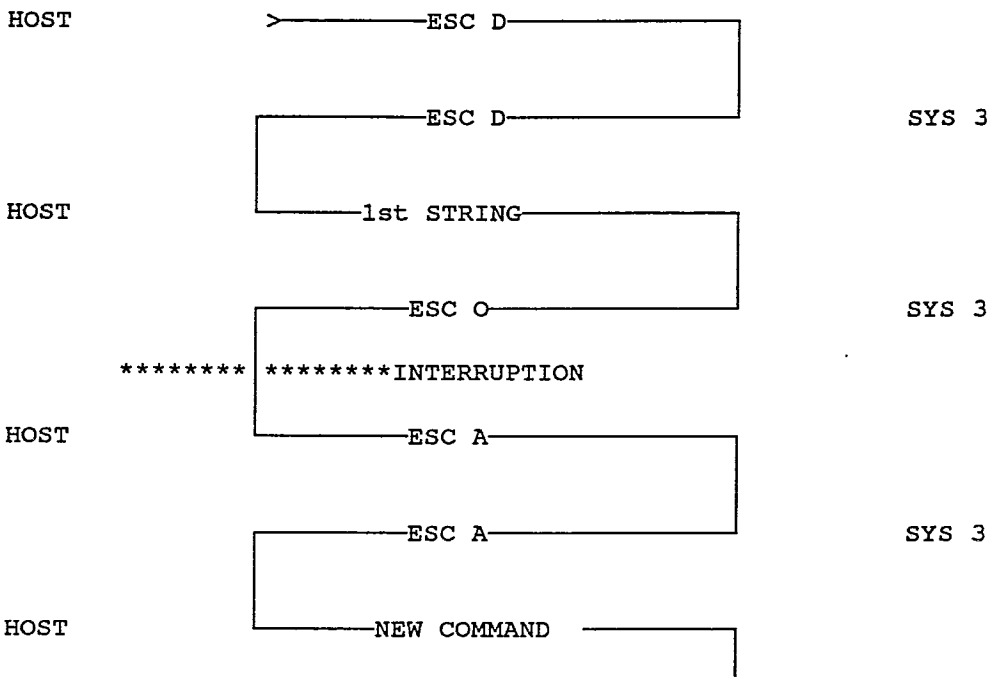
8.9 MEMORY PACK PROGRAMMING

MEMORY PACK programming can take place only if the MEMORY PACK is virgin; i.e. if there are no surveys programmed, whether in progress or completed.

8.9.1 Transmission Protocoll



8.9.2 Interrupt procedures ESC D



8.9.3 Order of the data transmitted from the host to the memory pack

RECORD N.1

survey data record.

1	YY	Year	*	
3	MM	Month	*	
5	GG	Day	*	Survey start
7	HH	Hour	*	
9	mm	Minute	*	
		format ASCII		

RECORD N.2

1	YY	Year	*	
3	MM	Month	*	
5	GG	Day	*	Survey end
7	HH	Hour	*	
9	mm	Minute	*	
		format ASCII		

RECORD N.3

1	EE	Enable/Disable configuration memorization format ASCII
2	BB	Code *
3	BB	Code *
4	BB	Code *
5	BB	Code * format ASCII msb lsb
6	mm	Minutes * Rate format ASCII
8	MODO	Programming mode Bit 0= 0 4W Bit 0= 1 3W Bit 1= 0 Low Voltage Bit 1= 1 Medium Voltage Bit 2= 0 Normal Bit 2= 1 Clamp meter inversion Bit 3= 0 No B.B Bit 3= 1 Black Box Bit 4= 0 No B.B with secondary program run Bit 4= 1 B.B with secondary program run Bit 5= 0 Pyrometer Bit 5= 1 LMA Bit 6= 0 Normal Bit 6= 1 Calibration Bit 7= Not used format HEX
9	KA	Corrent * Current
10	KA	Corrent * Full Scale
11	KA	Corrent * format HEX lsb msb
12	KV	Voltage * Voltage
13	KV	Voltage * full scale
14	KV	Voltage * format HEX lsb msb
15	CC	F.S. Power Factor format HEX
16	TT	Integration time format BCD packed

8.10 MEMORY PACK RESET COMMAND

The MEMORY PACK reset command is transmitted with only two characters like all the other reset commands.

The comando is active immediately and consists of the following two characters:

CAN D (18H,44H)

The command deletes all data from the MEMORY PACK, resetting all the information it contains.

This command deletes all the measurements and information contained in the MEMORY PACK; in view of the importance of the operation and its duration the selection should be protected at the level of the host computer and carried out off line; i.e. when the instrument is disconnected from its measurement functions.

8.11 ENERGY METER RESET COMMAND

The energy meter reset command is transmitted with just two characters like all reset commands.

The command is active immediately and consists of the following two characters:

CAN C (18H,43H)

This command resets all the active and reactive, and tariff band, energy meters.

8.12 MAXIMUM AND AVERAGE POWER RESET COMMAND

The maximum and average power reset command is transmitted in just two characters like all reset commands.

The command is active immediately and consists of the following two characters:

CAN P (18H,50H)

This command deletes all the average power buffers and the relative maximum power values.

The following are affected by this command:

Active powers
Apparent powers
Reactive powers
Distorsions.

8.13 GENERAL NO CLOCK RESET COMMAND

The general no clock reset command is transmitted in just two characters like all reset commands.

The command is active immediately and consists of the following two characters:

CAN G (18H,47H)

This command is used only if the instrument is no longer perfectly operational.

It resets all the meters and average values and provides a hardware reprogramming of the resources available, reprogramming them at the default values.

8.14 LOCAL PROGRAMMING LOCK COMMAND

This command disables local programming in all pages except the RESET page.
The LOCAL PROGRAMMING LOCK message appears whenever programming is attempted.

The only character required for this operation is:

DC3 (13H) ^S, XOFF

For reasons of time and space this command will be inserted in the version 2.0 (during December).

8.15 LOCAL PROGRAMMING RELEASE COMMAND

This command re-enables local programming of the instrument.

DC1 (11H) ^Q, XON

8.16 SURVEY IN PROGRESS STOP COMMAND

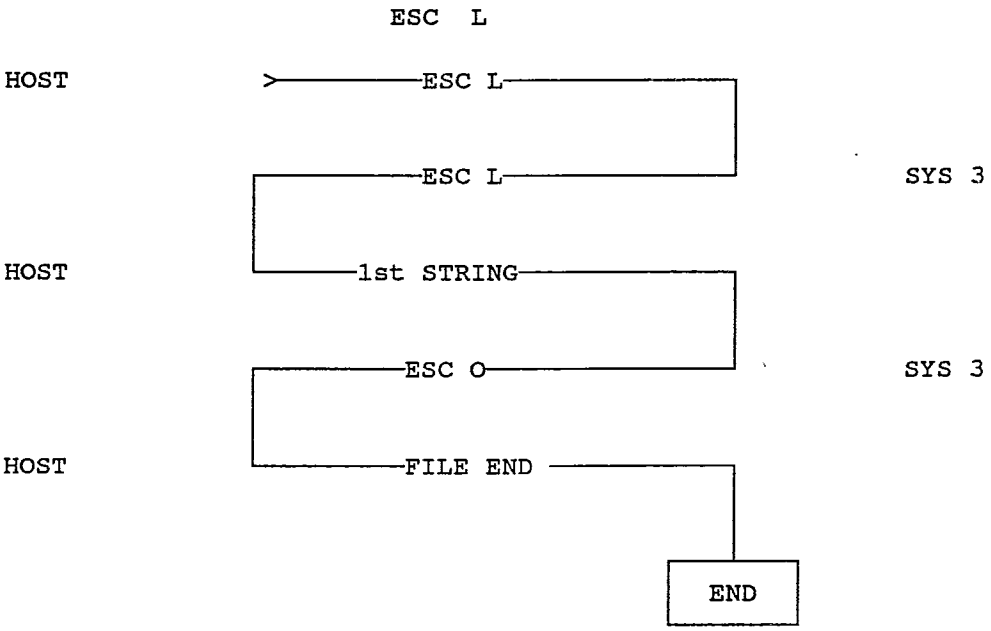
This commnad terminates the program in progress on the MEMORY PACK.
The command is active immediately and consists of the following two characters:

CAN S (18H,53H)

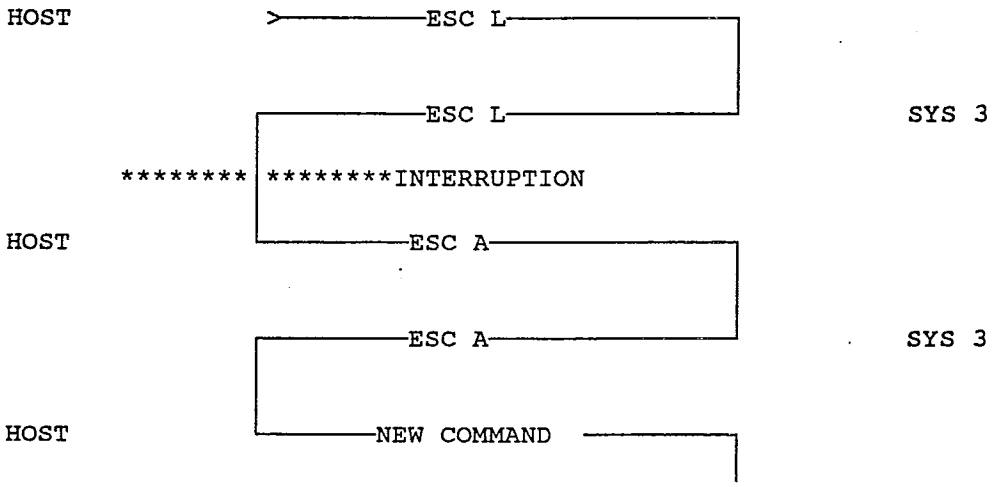
8.17 START OF MEMORY PACK MANUAL SURVEY

The MANUAL SURVEY can be started only if there is no survey in progress, if there are records free and if there is at least one survey which has not been programmed.

8.17.1 Transmission Protocoll



8.17.2 Interrupt procedure ESC L



8.17.3 Order of data transmitted by host to memory pack

RECORD N.1

1 CADENZA	2 byte	Sampling rate for manual survey(01/99) format ASCII msb,lsb
3 CODICE	4 "	Code of man. survey (0000/9999) format ASCII msb,ldb

8.18 COMMAND FOR FORCING AUTOMATIC PRINT

This command is active immediately and consists of the following two characters:

CAN S (18H,53H)

This command forces printing on the local printer of AUTOMATIC PRINT, PLOTTER 1 and PLOTTER 2

8.19 ALARM RESET COMMAND

The alarm reset command is transmitted in just two characters like all the other reset commands.

The command is active immediately and consists of the following two characters:

CAN A (18H,41H)

This command resets all the alarm presettings made:

- MINIMUM ALARMS
- MAXIMUM ALARMS
- TIME BAND ALARMS
- RELAY ALARMS

NACK 4 = Extra "STRING" message received instead of EOF

NACK 5 = Non-congruent record received

NACK 6 = MEMORY PACK not virgin

NACK 7 = BLACK BOX not present

NACK 8 = Number of page required not congruent

NACK 9 = BAND not preset

The message format is ASCII and it is closed by CR LF .