GL800 Interface Commands

Outline

Interface commands are a group of commands that are used to connect the GL800 to a PC via LAN or USB, change internal settings, and perform control functions when measurement data, etc., is received.

Interface Command Types

There are two types of interface commands sent from the PC to control the GL800: Setting commands and Query (Response) commands.

- **Setting commands**

Setting commands are commands that are used to change settings and to perform processing. These commands are sent from the PC but do not need to be received by the GL800.

- **Query commands**

Depending on the type of command, a Query command sent from the PC may require a query (response) to be returned from the GL800. Whenever a query command is sent from the PC, it must be received by the GL800.

Interface Command Format

Interface commands are formatted using ASCII character strings, and there is no distinction made between upper-case and lower-case characters. Moreover, all the query commands from the GL800 are in a uniformly abbreviated uppercase character format. A New Line code is appended to each command, according to the New Line code format specified at the GL800. The format will be CR+LF, CR, or LF.

( )
Command characters
The ASCII characters within this symbol represent a command for sending/receiving data. The character string comprises both upper-case and lower-case characters, and the upper-case characters are in an abbreviated format.

(?)
Query character
When the Query character is appended to a command, the command becomes a query command and is sent to the GL800.

(:)
Connection character (colon)
Used to connect command characters.

(;)
Continuation character (semicolon)
Used for continuous transmission without any breaks between the commands (please limit the number of characters sent at one time to 512).

<SP>
Blank space character
The blank space character indicates a space that is the size of one alphanumeric number.

<NR1>
Integer value
The integer value is an ASCII text string. Used for GL800 settings.

<NRf>
Decimal point, exponent, value with a unit attached
Represents a decimal value (such as 1.234), an exponent (such as 1E-6) or a value with a unit attached (such as IKHZ). As its use varies according to the command, please refer to the command flow chart for details.

<Logic Value>
Logic value
Represented by 1/0, ON/OFF, Enable/Disable, TRUE/FALSE, YES/NO, SET/RESET. Any of these can be used.

“Character string”
Character string
A character string must be enclosed in double quotation marks (" ").
Example: :ANN:TITL "DEMO RECORD"

Error Query

If an invalid command or a command that cannot be set is sent, an error occurs at the GL800 and an error query is generated. The :STAT:ERR? error query can be used to search for the error. Moreover, since up to 255 error queries are stored in the buffer, errors starting with the oldest error are sent in response whenever a :STAT:ERR? command is sent. Please refer to the Status Report section for further details on the errors.

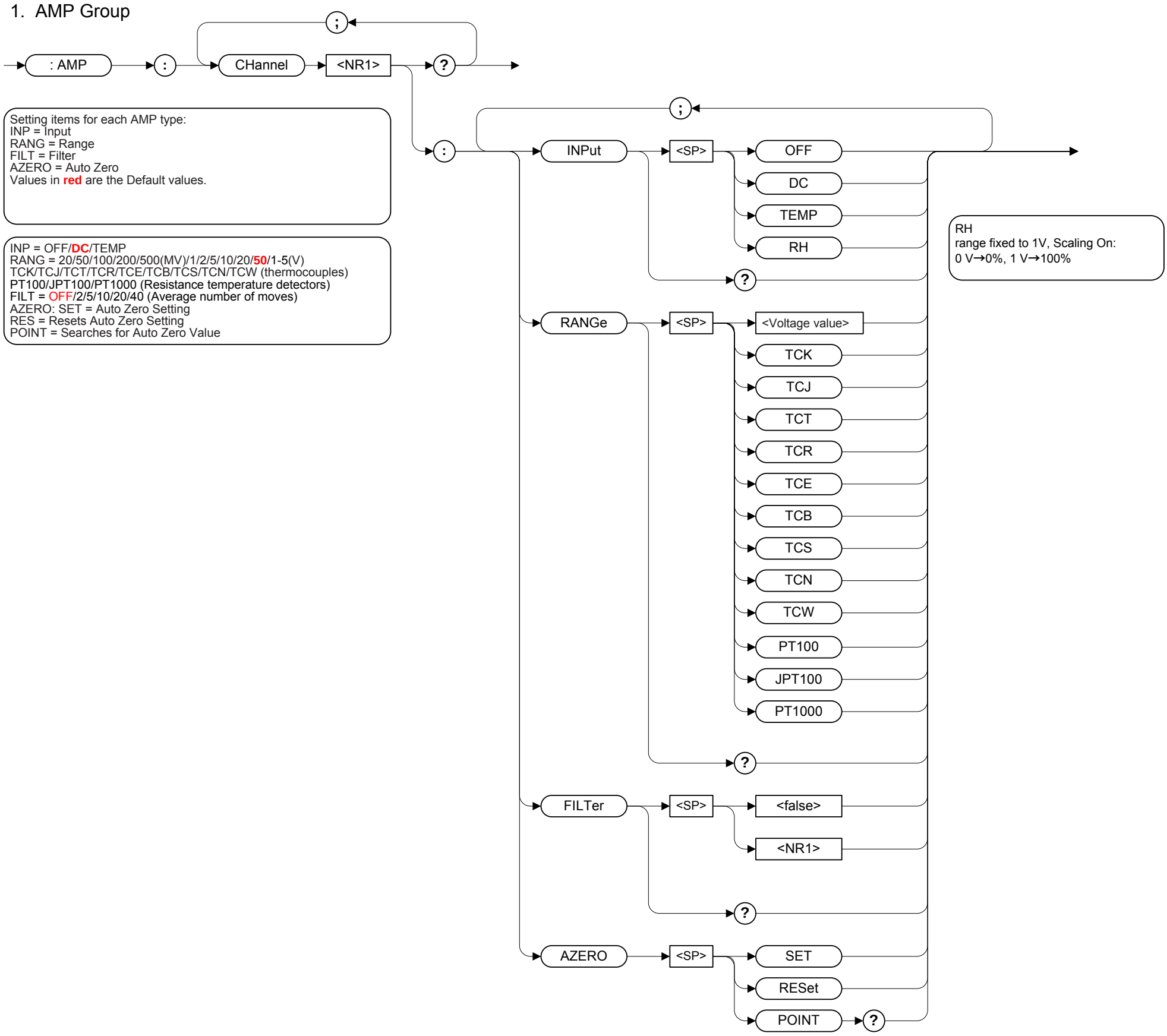
Status Command

The status command is used to check the status of the GL800. :STAT:COND? can be used to search for each status, but at high-speed operations, such as when the GL800 is capturing data to memory at a rate that doesn't even reach 1 second, the status condition changes too quickly from 0 → 1 → 0 to enable an accurate confirmation to be made of the 1 status. At this time, it is recommended that you use :STAT:FILT to enable the status changes to be saved.

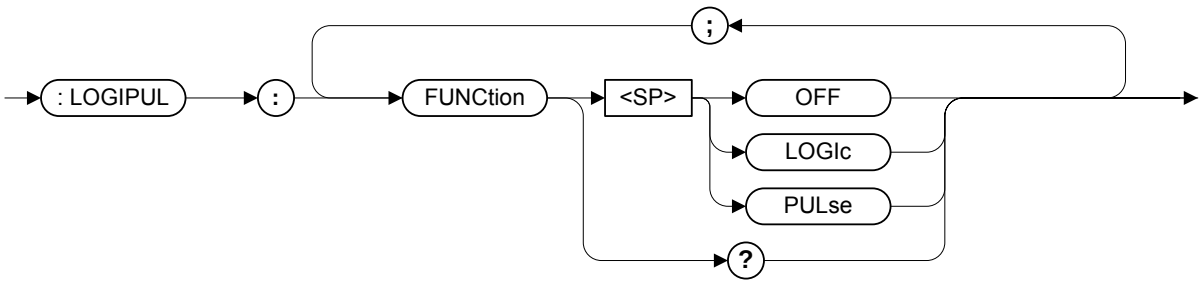
Command Examples

Command Sent from the PC	Commands Received from the GL800	Explanation
:AMP:CH1?	:AMP:CH1:INP DC;RANG 50MV;FILT OFF;TYP V	Queries the Input, Range, Filter, and Amp Type for CH1.
:AMP:CH1:RANG 50MV	None	Sets the Range for CH1 to 50mV.
:AMP:CH5:RANG TCK;RANG?	:AMP:CH5:RANG TCK	Sets the Range for CH5 to TCK, and queries the range for the same channel.

1. AMP Group

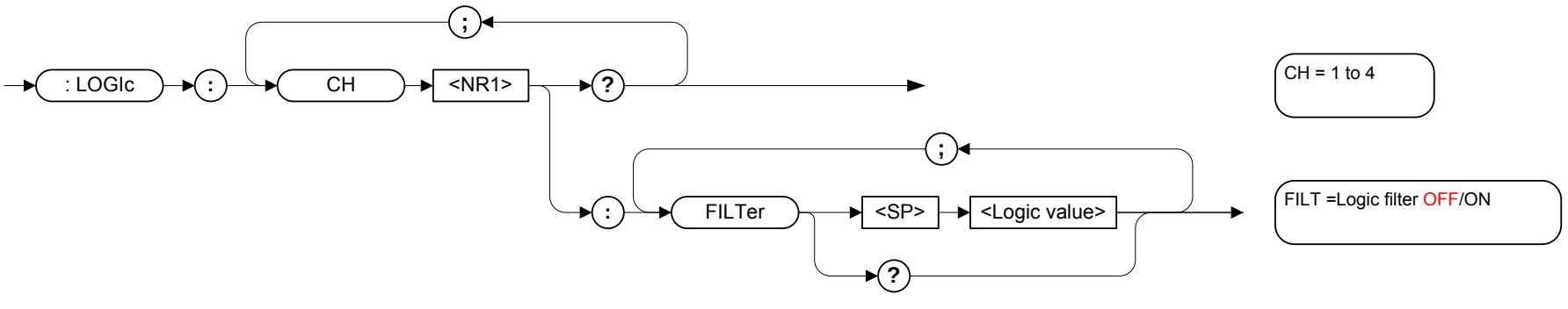

: AMP
:
CHannel
<NR1>
?
;
Setting items for each AMP type:
INP = Input
RANG = Range
FILT = Filter
AZERO = Auto Zero
Values in red are the Default values.
INP = OFF/DC/TEMP
RANG = 20/50/100/200/500(MV)/1/2/5/10/20/50/1-5(V)
TCK/TCJ/TCT/TCR/TCE/TCB/TCS/TCN/TCW (thermocouples)
PT100/JPT100/PT1000 (Resistance temperature detectors)
FILT = OFF/2/5/10/20/40 (Average number of moves)
AZERO: SET = Auto Zero Setting
RES = Resets Auto Zero Setting
POINT = Searches for Auto Zero Value
INPut
<SP>
OFF
DC
TEMP
RH
RH
range fixed to 1V, Scaling On:
0 V→0%, 1 V→100%
RANGe
<Voltage value>
TCK
TCJ
TCT
TCR
TCE
TCB
TCS
TCN
TCW
PT100
JPT100
PT1000
FILTer
<false>
<NR1>
AZERO
SET
RESet
POINT

2. LOGIC/PULSE Group



FUNC= Logic/Pulse switching,
OFF/LOGIc/PULse

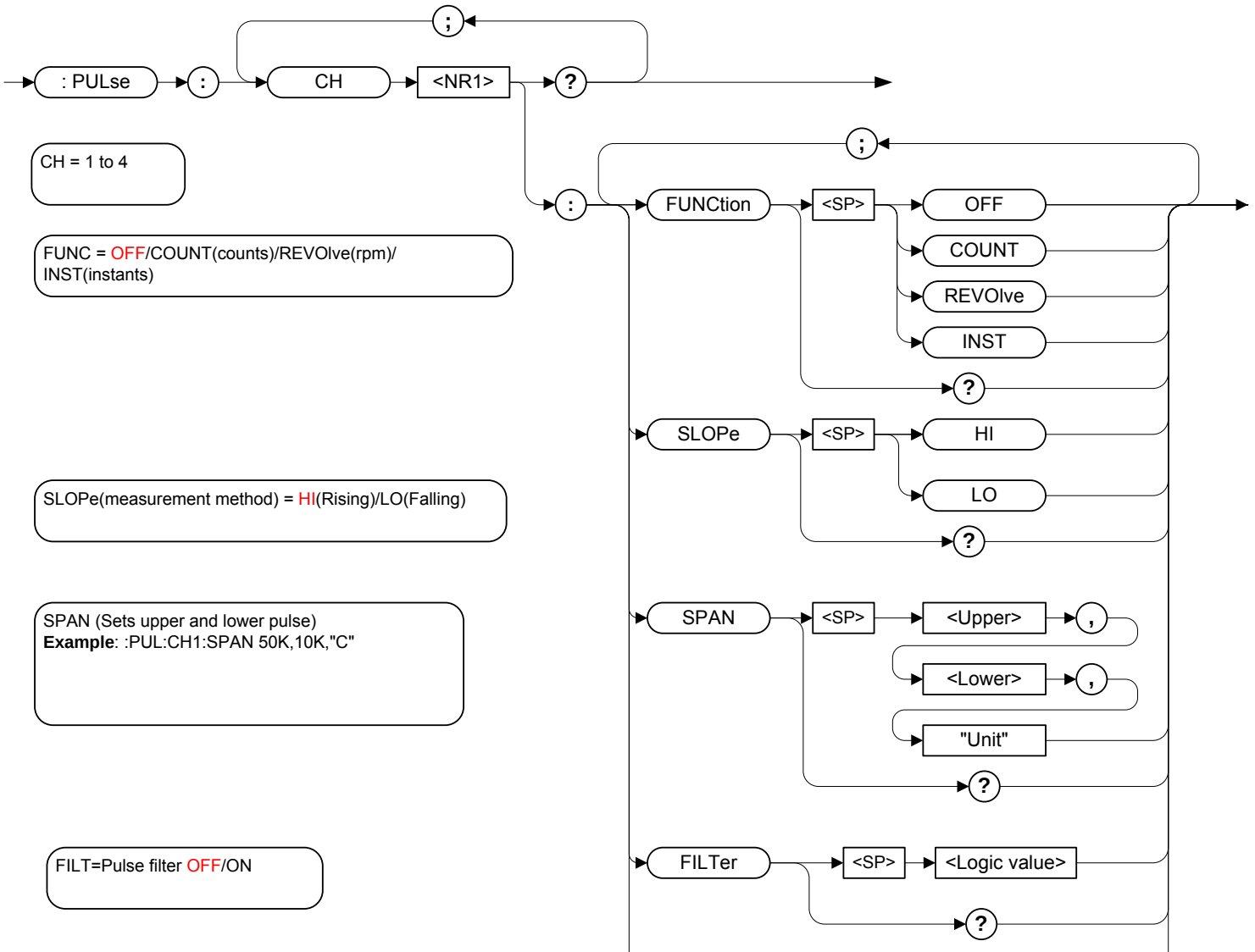
3. LOGIC Group



CH = 1 to 4

FILT =Logic filter OFF/ON

4. PULse Group



CH = 1 to 4

FUNC = OFF/COUNT(counts)/REVOlve(rpm)/
INST(instants)

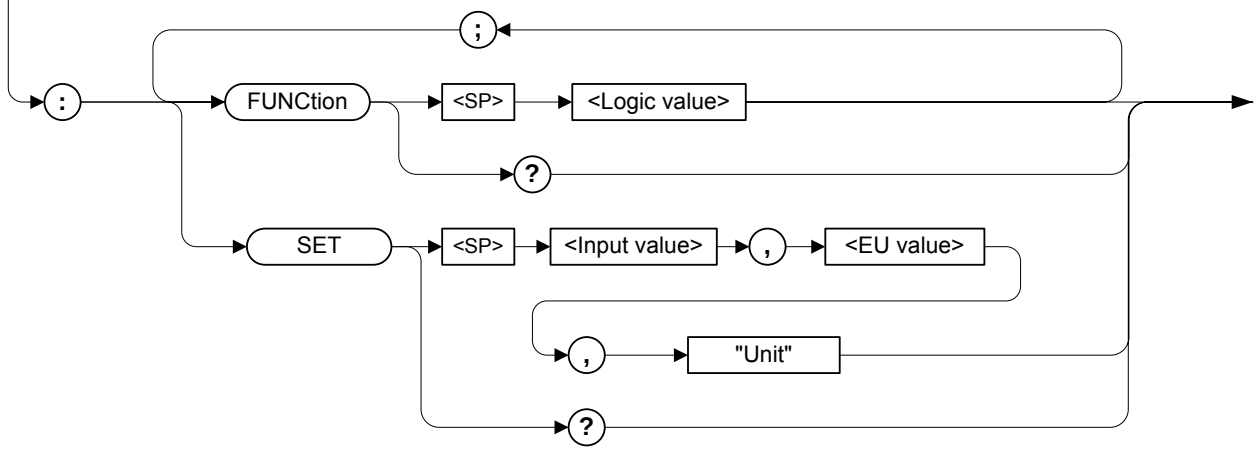
SLOPe(measurement method) = HI(Rising)/LO(Falling)

SPAN (Sets upper and lower pulse)
Example: :PUL:CH1:SPAN 50K,10K,"C"

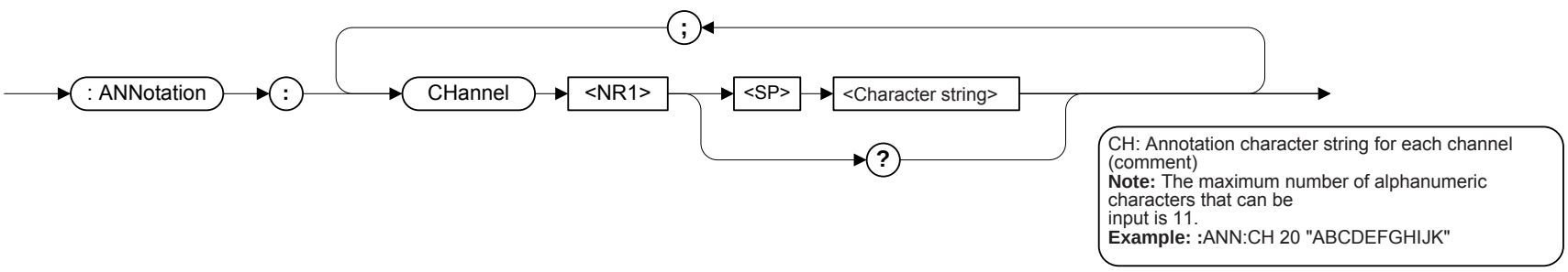
FILT=Pulse filter OFF/ON

SCAle (Pulse scaling setting)
FUNC=OFF/ON (Scale On/Off)
SET=Input, EU, Unit (Optional)

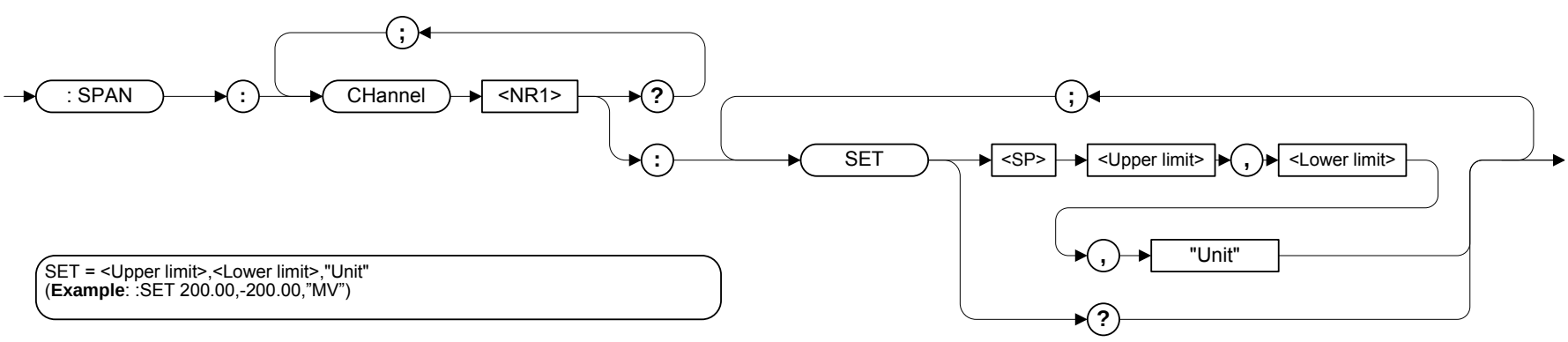
Example: :PUL:CH1:SCAL:FUNC ON
:PUL:CH1:SCAL:SET 1,100,"mL"



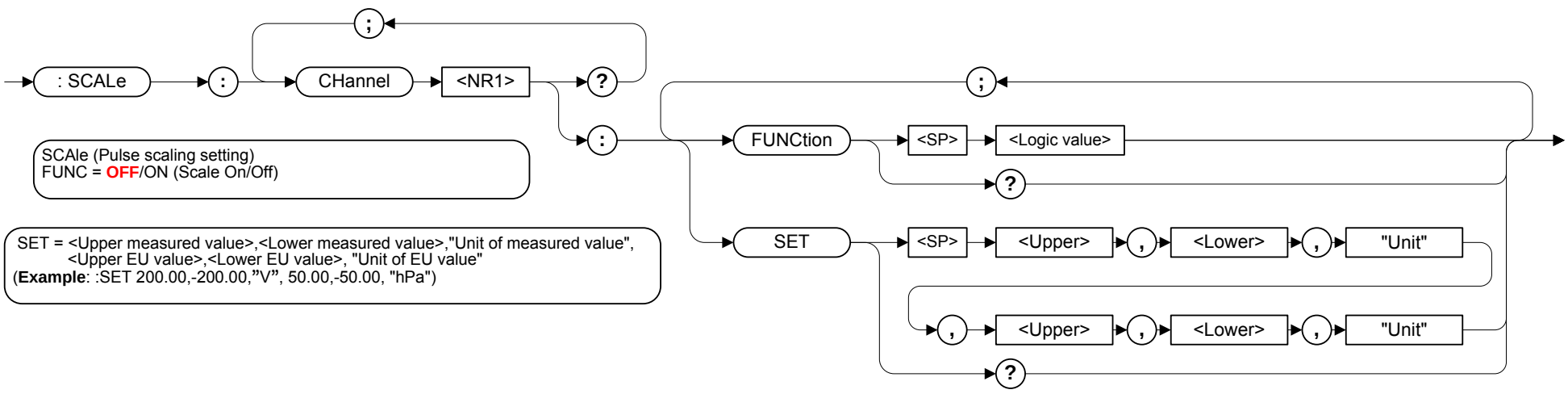
5. ANNOTATION Group :



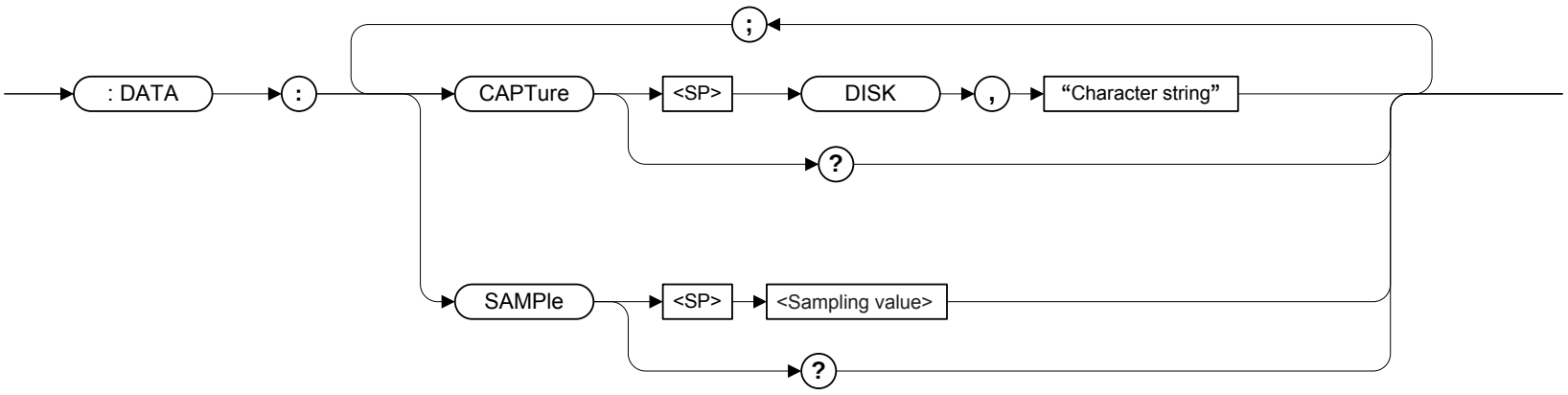
6. SPAN Group



7. SCALe Group



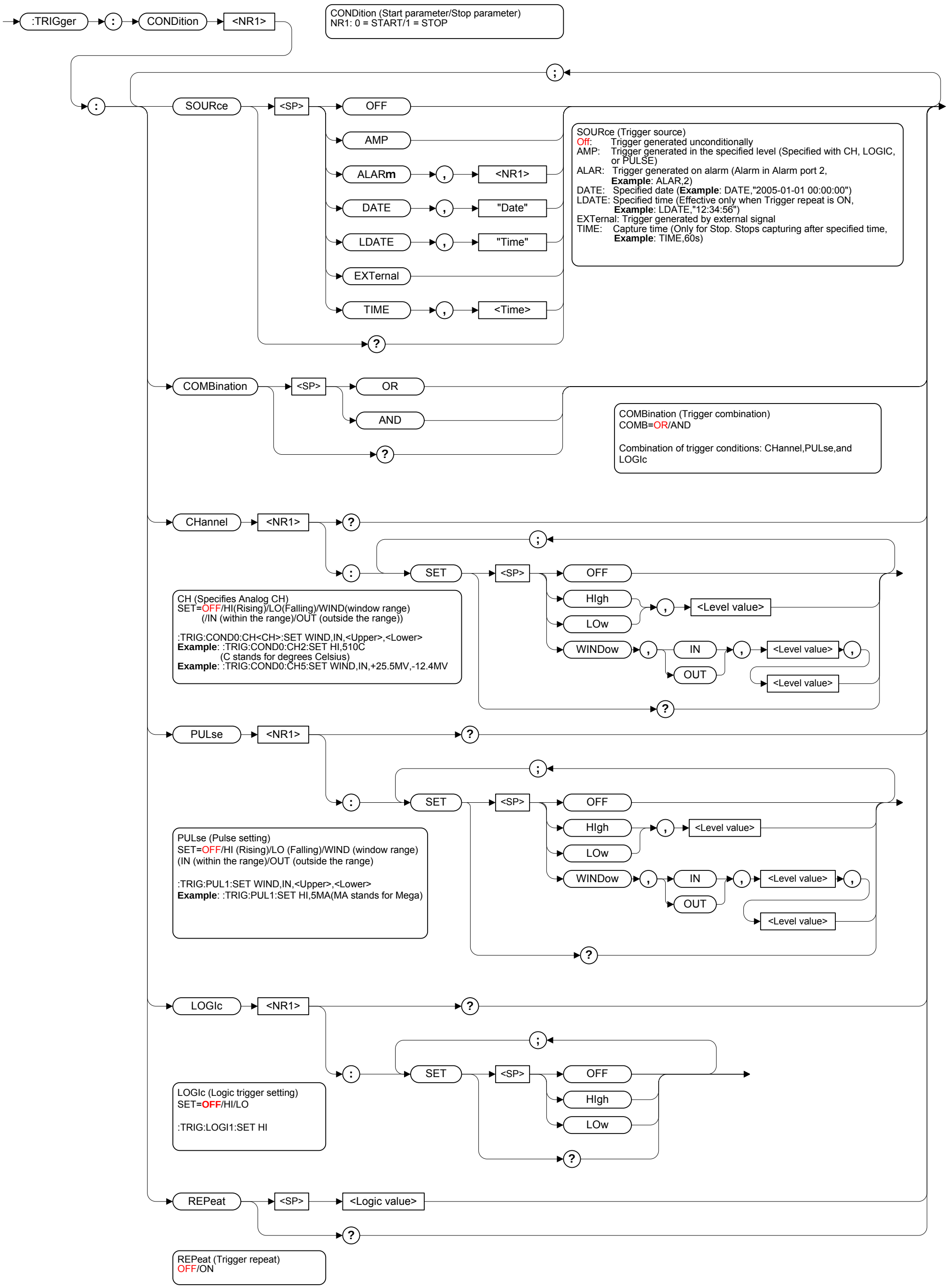
8. DATA Group :



SAMP (Sampling interval)
100/200/500(MS)/1/2/5/10/20/30/60/120/
300/600/1200/1800/3600(S)
Example: :DATA:SAMP 500MS

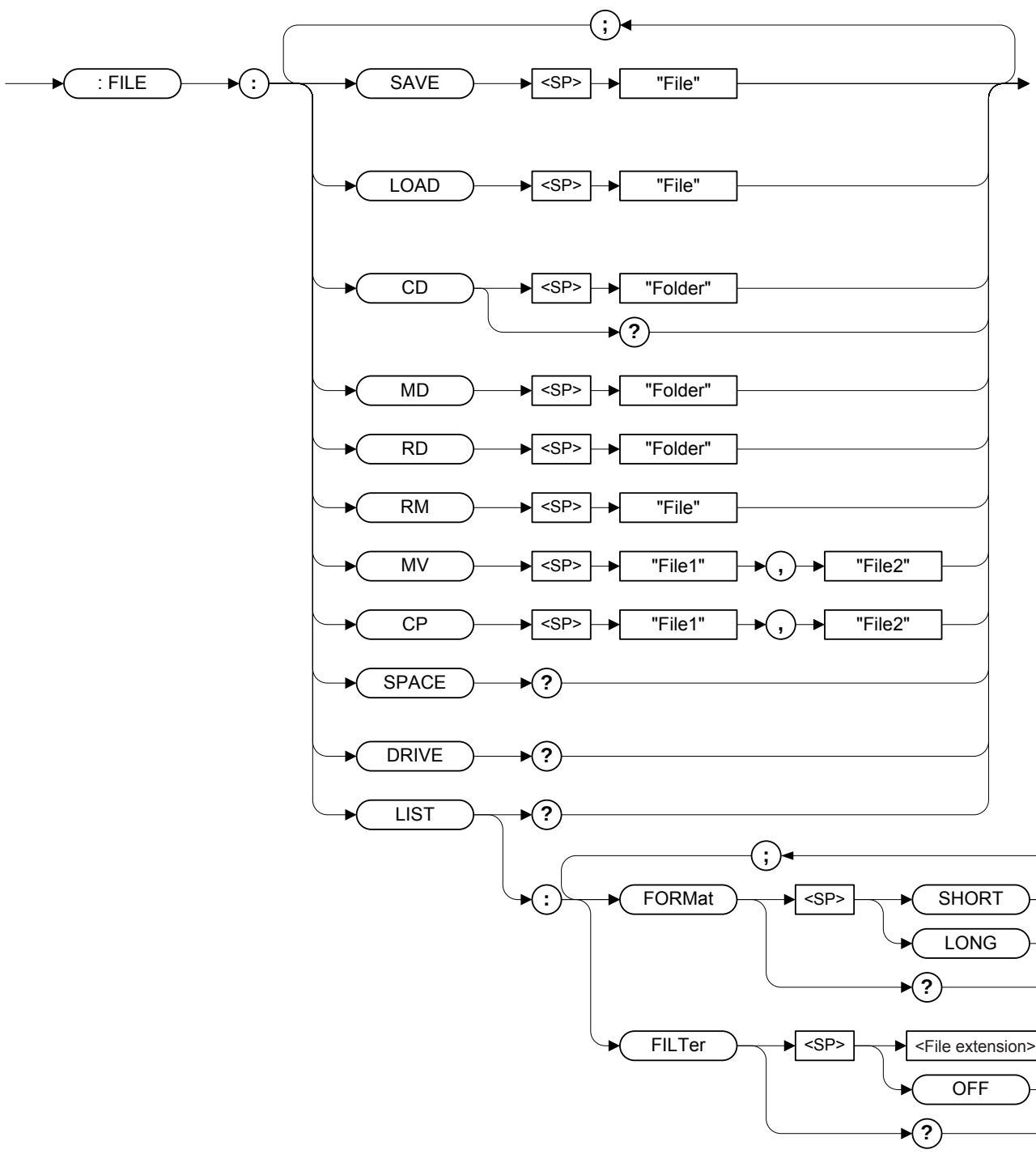
CAPT (Data capture destination)
Internal memory = \MEM\
USB device = \USB1\ , \USB2\.... (The number increases as the number of devices increases)
Example: Disk: :DATA:CAPT DISK,"\MEM\DEFAULT.GBD"
Example: For USB device: :DATA:CAPT DISK,"\USB1\FOLDER\0001.GBD"
Example: For automatic file name :DATA:CAPT DISK,"\MEM\FOLDER\"
(When a folder is specified for the path, a folder is created with the name in the form of Date-Time in the specified folder, and a file is created with the name in the form of Date-Time in the created folder. 050101-123456.GBD)

9. TRIGger Group:



10. ALARm Group:

11. FILE Group :



About the Device memory and USB device paths
Device memory: MEM\
USB device: USB1\, USB2\, USB3\, USB4\
(Up to a maximum of four USB devices can be recognized)

SAVE: Saves the specified file
Example: :FILE:SAVE "\MEM\DEFAULT.CND"

LOAD: Loads the specified file
Example: :FILE:LOAD "\MEM\DEFAULT.CND"

CD: Changes the current directory
Example: :FILE:CD “ \MEM\FOLDER1\ ”
:FILE:CD “ \USB1\TEST\ ”

MD: Creates a directory
Example: :FILE:MD "\MEM\FOLDER2\"

RD: Removes the directory
Example: :FILE:RD "\MEM\FOLDER3\"

MV: Moves the file
Example: :FILE:MV "\MEM\AAAA.GBD" ,"\USB1\BBB\AAA.GBD"

CP: Copies the file
Example: :FILE:CP "\MEM\AAA.GBD" ,"\USB1\BBB\BBB.GBD"

DRIVE: Display of built-in drive/USB device
MEMD= Device memory
USBD= USB device
Example: :FILE:DRIVE“MEM:MEMD USB1:USBD USB2:USBD”

SPACE: Use the CD command to browse the available disk space (bytes) set
Example: :FILE:SPACE 12345678

LIST: List Display
FORM: **SHORT** = File name only
LONG = File name + date + size + attributes
FILT: Extension (".***" 4 characters including the dot)
Only the files for which extensions were set in Filter are displayed.
OFF = All the files are displayed.

Example of :FILE:LIST:FORM SHORT query

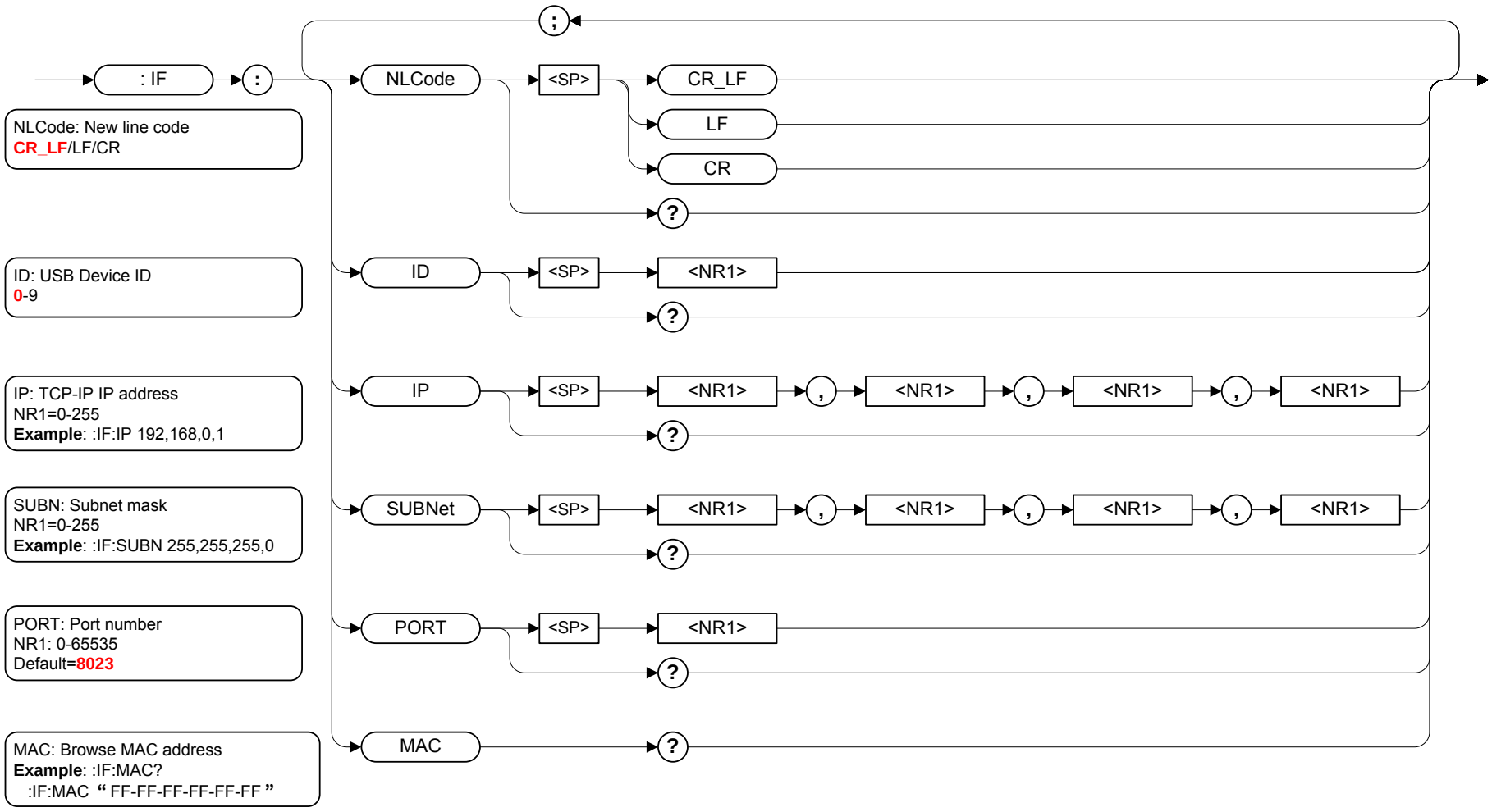
(When root: Displays the connected device(s))
:FILE:LIST ”MEM\”,“USB1\”
(When not root)
:FILE:LIST “FOLDER\”,”FOLDER2\”,“050101-010101.GBD”,”050502-010101.GBD”

Example of :FILE:LIST:FORM LONG query

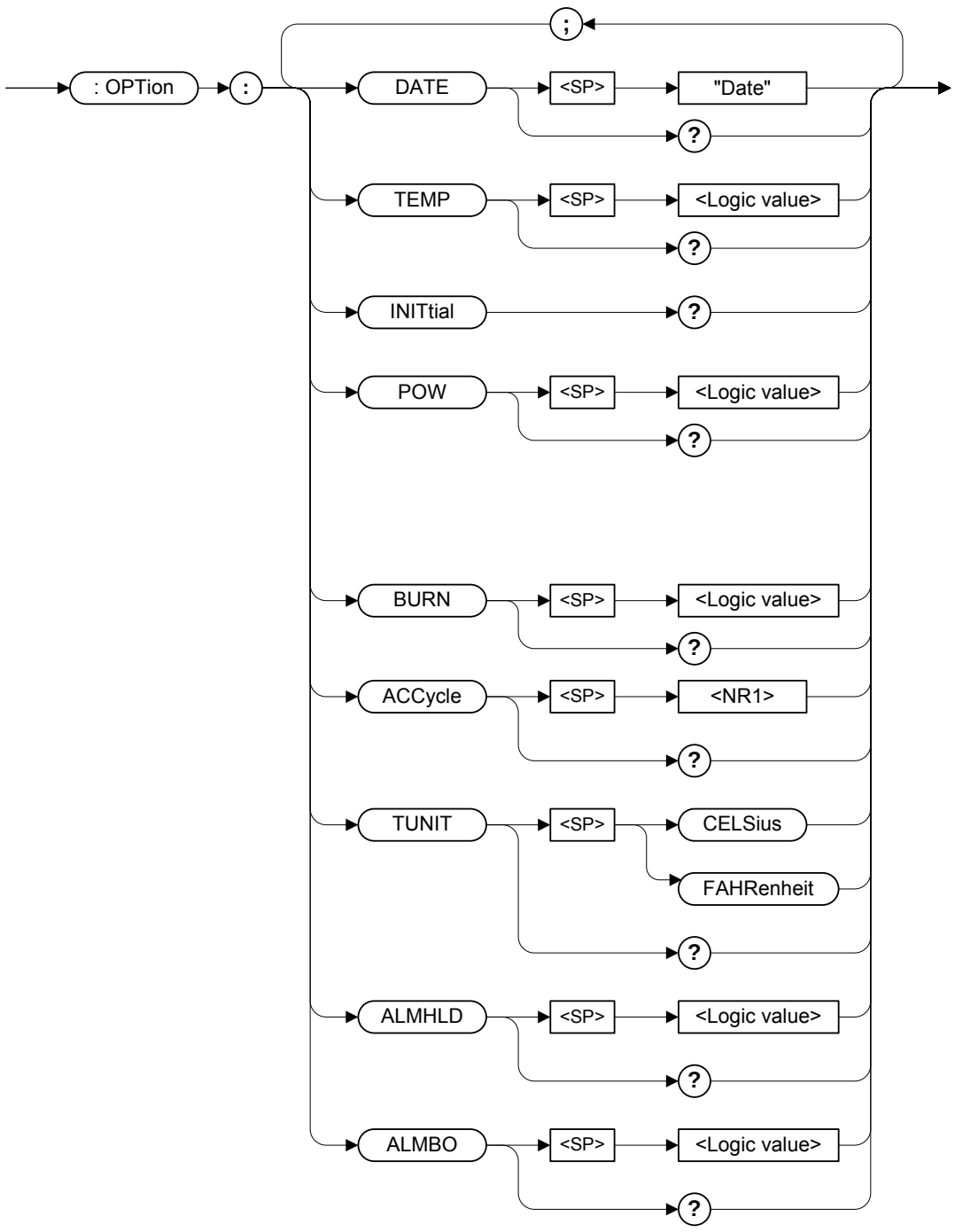
Attribute	Description
dw-	Directory (folder) to which writing is possible
-w-	File to which writing is possible

(When root: Displays the connected device(s)) <Device><Available space><Attribute>
:FILE:LIST “MEM\ 123456 d--”,”USB1\ 123456 d--”
(When not root: <File/folder> <Date created> <Attribute>
:FILE:LIST “FOLDER\ 2005/01/01 12:34:56 dw-”,”FOLDER2\ 2005/01/01 12:34:57 dw-”,“050101-010101.GBD 2005/01/01 12:34:56 -w-”,”050502-010101.GBD 2005/01/01 12:34:56 -w-”

12. IF Group :


;
: IF
:
NLCode
<SP>
CR_LF
LF
CR
?
ID
<SP>
<NR1>
?
IP
<SP>
<NR1>
,
<NR1>
,
<NR1>
,
<NR1>
?
SUBNet
<SP>
<NR1>
,
<NR1>
,
<NR1>
,
<NR1>
?
PORT
<SP>
<NR1>
?
MAC
?
NLCode: New line code
CR_LF/LF/CR
ID: USB Device ID
0-9
IP: TCP-IP IP address
NR1=0-255
Example: :IF:IP 192,168,0,1
SUBN: Subnet mask
NR1=0-255
Example: :IF:SUBN 255,255,255,0
PORT: Port number
NR1: 0-65535
Default=8023
MAC: Browse MAC address
Example: :IF:MAC?
:IF:MAC “FF-FF-FF-FF-FF-FF”

13. OPTion Group :



DATE: Date
Example: "2003-12-12 11:22:33"

TEMP: Room temperature compensation
ON = Internal/OFF = External

INITial: Factory default settings
Settings are returned to the factory default setting after this command
has been executed and "OK" is returned.
Note: As the internal settings will be changed after the command has
been executed, please reconnect the interface.

POW: Power on start
In this mode, data capture starts as soon as the power is turned on.

BURN: Burnout
OFF/**ON**

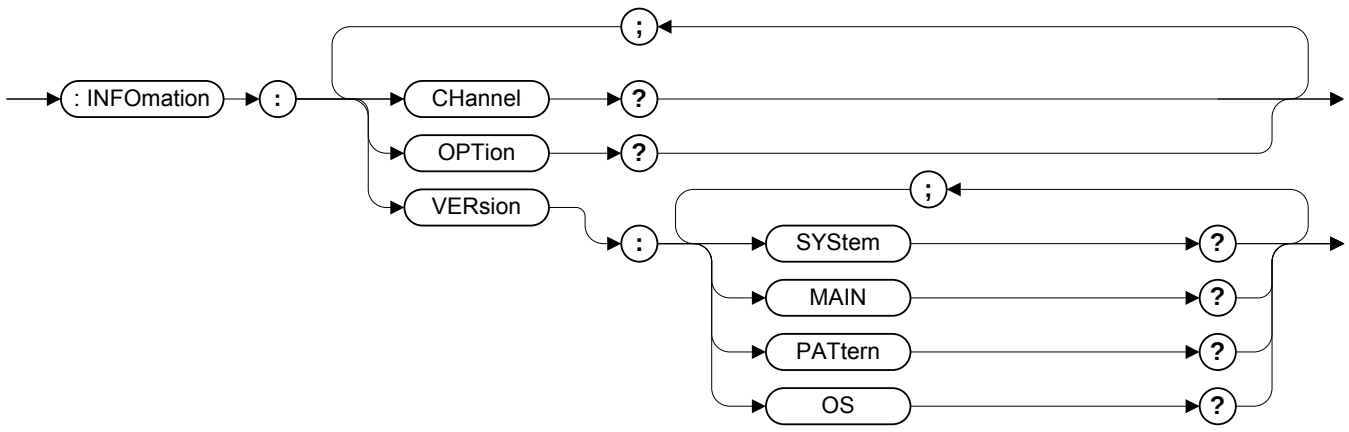
ACCycle: Power line frequency
50/60

TUNIT: Switches the display between Celsius and Fahrenheit
CELSius: Celsius
FAHRenheit: Fahrenheit

ALMHLD: Alarm Hold function
Off/**On**

ALMBO: Generate alarm at burnout
Off/On

14. INFOrmation Group :

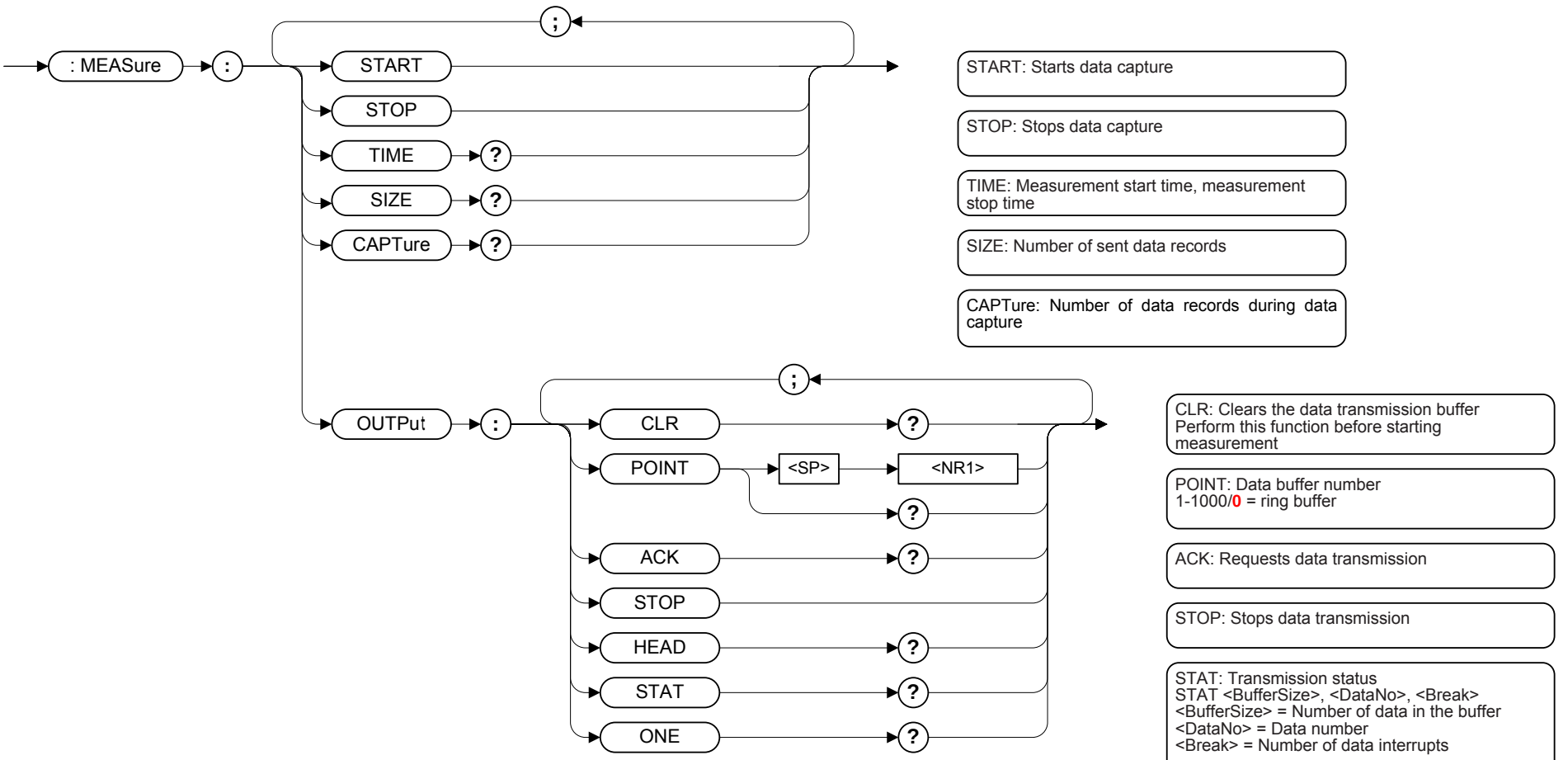


CH: Total number of channels

OPT: Not used

VER: Version information
SYS = System Control FPGA
MAIN = Main CPU Firmware
PAT=Pattern ROM
OS = Operating System Version

15. MEASure Group :



START: Starts data capture

STOP: Stops data capture

TIME: Measurement start time, measurement stop time

SIZE: Number of sent data records

CAPTure: Number of data records during data capture

CLR: Clears the data transmission buffer
Perform this function before starting measurement

POINT: Data buffer number
1-1000/**0** = ring buffer

ACK: Requests data transmission

STOP: Stops data transmission

STAT: Transmission status
STAT <BufferSize>, <DataNo>, <Break>
<BufferSize> = Number of data in the buffer
<DataNo> = Data number
<Break> = Number of data interrupts

ONE: 1 record output
Receives the instantaneous value of sent data

Sent data (Fixed number of bytes independent of On/Off)
- WORD Align
0: Analog data (:INFO: for the number of channels)
1: Pulse data Upper-level 16 bits
2: Pulse data Lower-level 16 bits (Repeat 1:2 for 4 channels)
3: Logic data 16 bits
4: Alarm data (INFO: Number of channels + Number of bits required for the number of logic/alarm)
5: Status

(4: Alarm data (Example of 20-ch packaging))
+0 5432109876543210 ←Bit
|----------| ← Alarm for analog data 1CH-16CH (Bit0=CH1)

+1 5432109876543210 ←Bit
|----| ← Alarm for analog data 17CH-20CH (Bit0=CH17)

+2 5432109876543210 ←Bit
|----| |----| ← Alarm for pulse data (Bit0=CH1)
↑----------Alarm for logic data (Bit4=CH1)

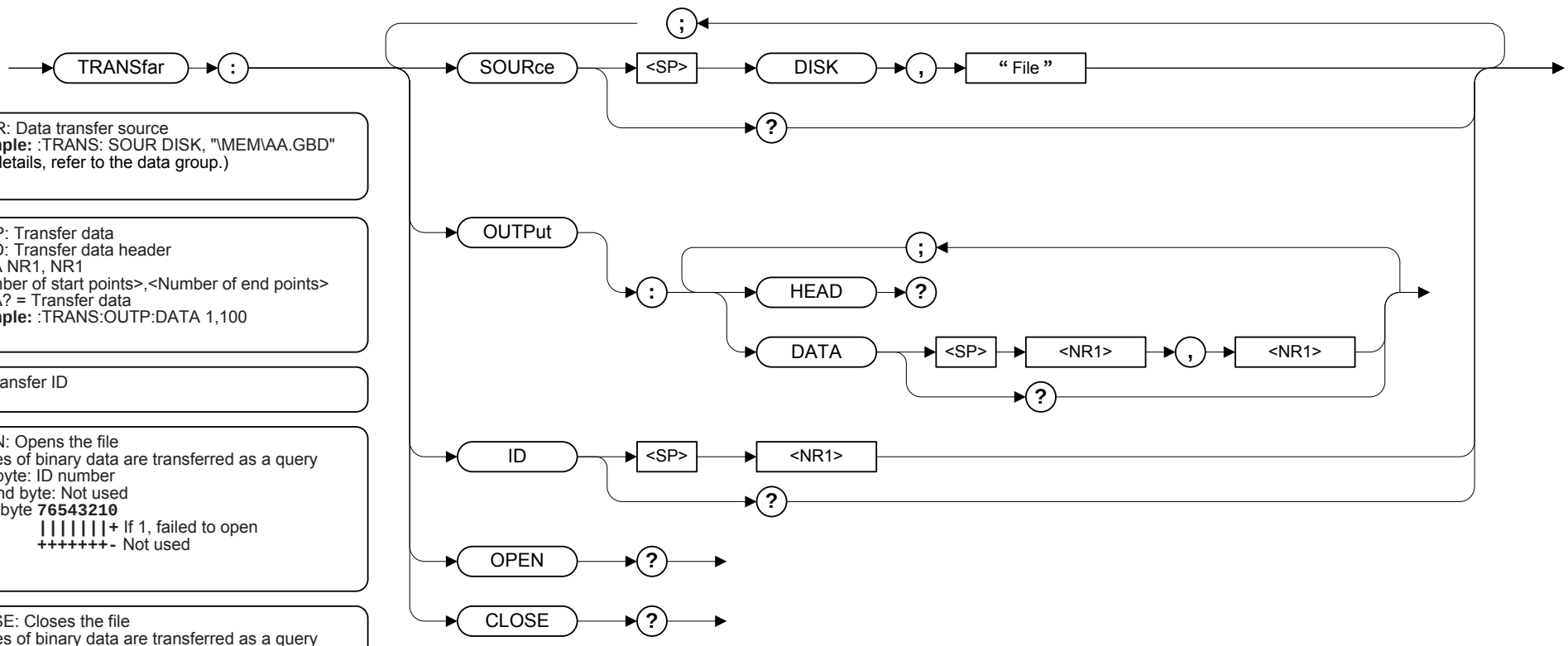
(5: Status)
Bit1 = Capture full (0=not full|1= full)
Bit2/Bit3 = Battery status
Bit4 = AC power supply|battery power supply

Battery Bit	Full	Medium	Low	No power
Bit3	0	0	1	1
Bit2	0	1	0	1

mch = :INFO: number of channels
Number of bytes = (mch + 8 + 1 + ((mch+15)/16) + 1 + 1) * 2;

Analog | Pulse | Logic | Analog alarm | Logic/Pulse alarm | Status

16. TRANSfar Group :



SOUR: Data transfer source
Example: :TRANS: SOUR DISK, "\MEM\AA.GBD"
(For details, refer to the data group.)

OUTP: Transfer data
HEAD: Transfer data header
DATA NR1, NR1
<Number of start points>,<Number of end points>
DATA? = Transfer data
Example: :TRANS:OUTP:DATA 1,100

ID: Transfer ID

OPEN: Opens the file
3 bytes of binary data are transferred as a query
First byte: ID number
Second byte: Not used
Third byte **76543210**
|||||||+ If 1, failed to open
+++++++- Not used

CLOSE: Closes the file
2 bytes of binary data are transferred as a query
First byte: Not used
Second byte **76543210**
|||||||+ If 1, failed to close
+++++++- Not used

OUTP:DATA? Contents
#6****** (8 bytes, ****** represents the number of bytes [size to be read out])
0: Binary status (16 bits, not used)
↓↓↓↓Size part repeated ↓↓↓↓
1: Analog data (excluding channels for which MeasOff has been specified)
2: Pulse data 1 (Upper-level 16 bits) (None if pulse 1 has been specified as off)
3: Pulse data 1 (Lower-level 16 bits) (None if pulse 1 has been specified as off)
4: Pulse data 2 (Upper-level 16 bits) (None if pulse 2 has been specified as off)
5: Pulse data 2 (Lower-level 16 bits) (None if pulse 2 has been specified as off)
6: Pulse data 3 (Upper-level 16 bits) (None if pulse 3 has been specified as off)
7: Pulse data 3 (Lower-level 16 bits) (None if pulse 3 has been specified as off)
8: Pulse data 4 (Upper-level 16 bits) (None if pulse 4 has been specified as off)
9: Pulse data 4 (Lower-level 16 bits) (None if pulse 1 has been specified as off)
10: Logic data (None if logic has been specified as off)
11: Alarm data (always sent)
↑↑↑↑Size part repeated ↑↑↑↑
12: Checksum (16 bits)

(11: Alarm data (example in the case of 20-channel implementation))
+0 **5432109876543210** bit
|--------------| ← Alarm (Bit 0 = CH1) of analog data of channels 1 through 16

+1 **5432109876543210** bit
|--| ← Alarm (Bit 0 = CH 17) of analog data of channels 17 through 20

+2 **5432109876543210** bit
|--||--| ← Alarm (Bit 0 = CH 1) of pulse data
↑---------- Alarm (Bit 4 = CH 1) of logic data
None when :LOGIPUL:FUNC:OFF

TRANSfer commands

SOUR:
Selects the file to be transferred from the GL800 to the PC. Specify a file name that includes the full path.

OUTPut:
HEAD transfers the header file. DATA sets the start and end points, and DATA? starts data transfer.

ID:
IDs are used when transferring multiple files. This command is used to perform ID setting and searching.

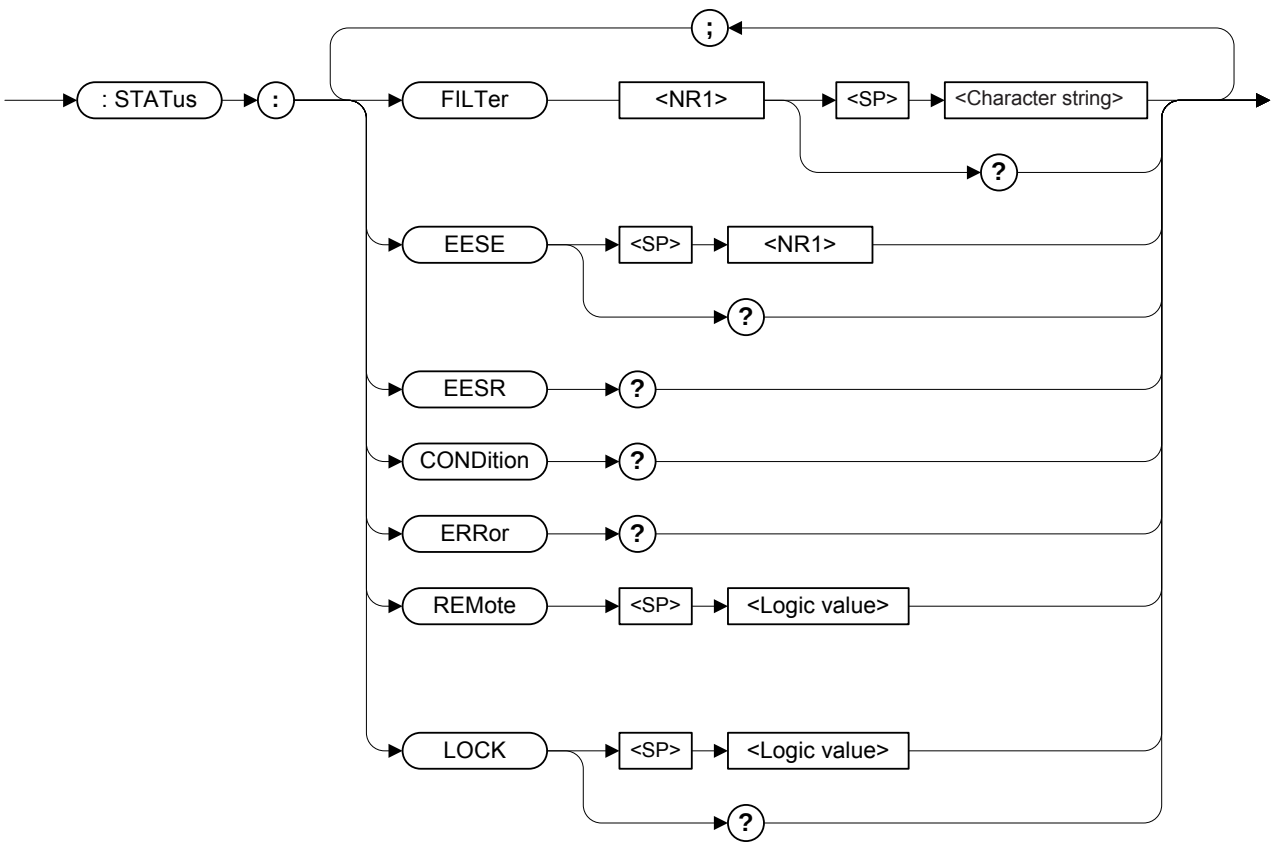
OPEN:
Opens the file that was selected for SOUR. A Query is used to indicate the ID of the opened file, by issuing an ID number (from 1 to 16) for that file when the file is opened. Moreover, when the file is opened, an ID is set for that file in the same way as the ID (ID number) was issued by the ID setting command.

CLOSE:
Closes the open file after the data has been transferred.

[Normal procedure]:
1. Specify file as the source of the data you want to transfer.
2. Use OPEN? to open the file.
3. Query to return an ID.
4. Use OUTP:HEAD? to get the header.
5. Use OUTP:DATA <NR1>,<NR1>to set the file points to get.
6. Use OUTP:DATA? to get the data.
7. Use CLOSE to close the file after data transfer.

[ID Usage Example]:
1. Use SOUR to select file A, then OPEN to open file A (ID1).
2. Use SOUR to select file B, then OPEN to open file B (ID2).
3. Use ID1 to set the ID to 1.
4. Use OUTP:HEAD? to get the file A header.
5. Use ID2 to set the ID to 2.
6. Use OUTP:HEAD? to get the file B header.
7. Set the ID to ID1.
8. Use OUTP: DATA<NR1>,<NR1> to set the file A points.
9. Set the ID to ID2.
10. Use OUTP: DATA<NR1>,<NR1> to set the file B points.
11. Set the ID to ID1.
12. Use OUTP: DATA? To get the file A data.
13. Set the ID to ID2.
14. Use OUTP: DATA? to get the file B data.
15. Set the ID to ID1.
16. Use CLOSE to close file A.
17. Set the ID to ID2.
18. Use CLOSE to close file B.

17 STATus Group :



FILT: Status filter
FILT<Bit><NEV/RISE/FALL/BOTH>
<BIT> = 0-15
<NEV> = No detection
<RISE> = Detection of rise
<FALL> = Detection of fall
<BOTH> = Detection of both rise and fall

EESE: Extended Event Enable Register

EESR: Extended Event Status Register

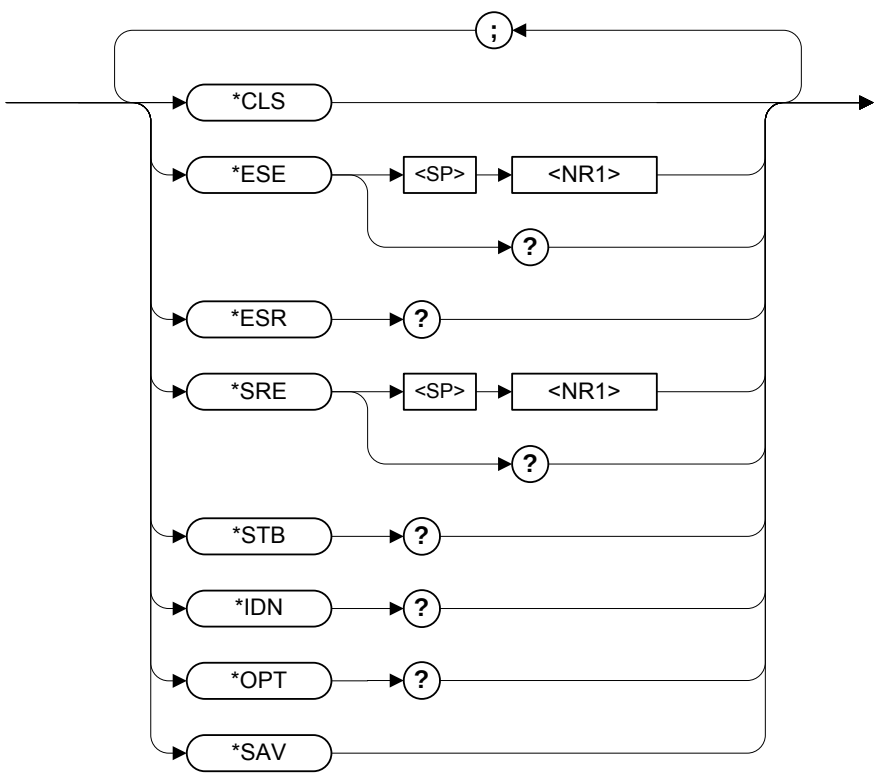
COND: Device Status Register

ERR: Error Code

REM: Remote
OFF/ON

LOCK: Local Lockout
OFF/ON

18. **COMMON Commands** :



*CLS: Error Query Initialization

ESE: Standard Event Enable Register

ESR: Standard Event Status Register

SRE: Service Request Register

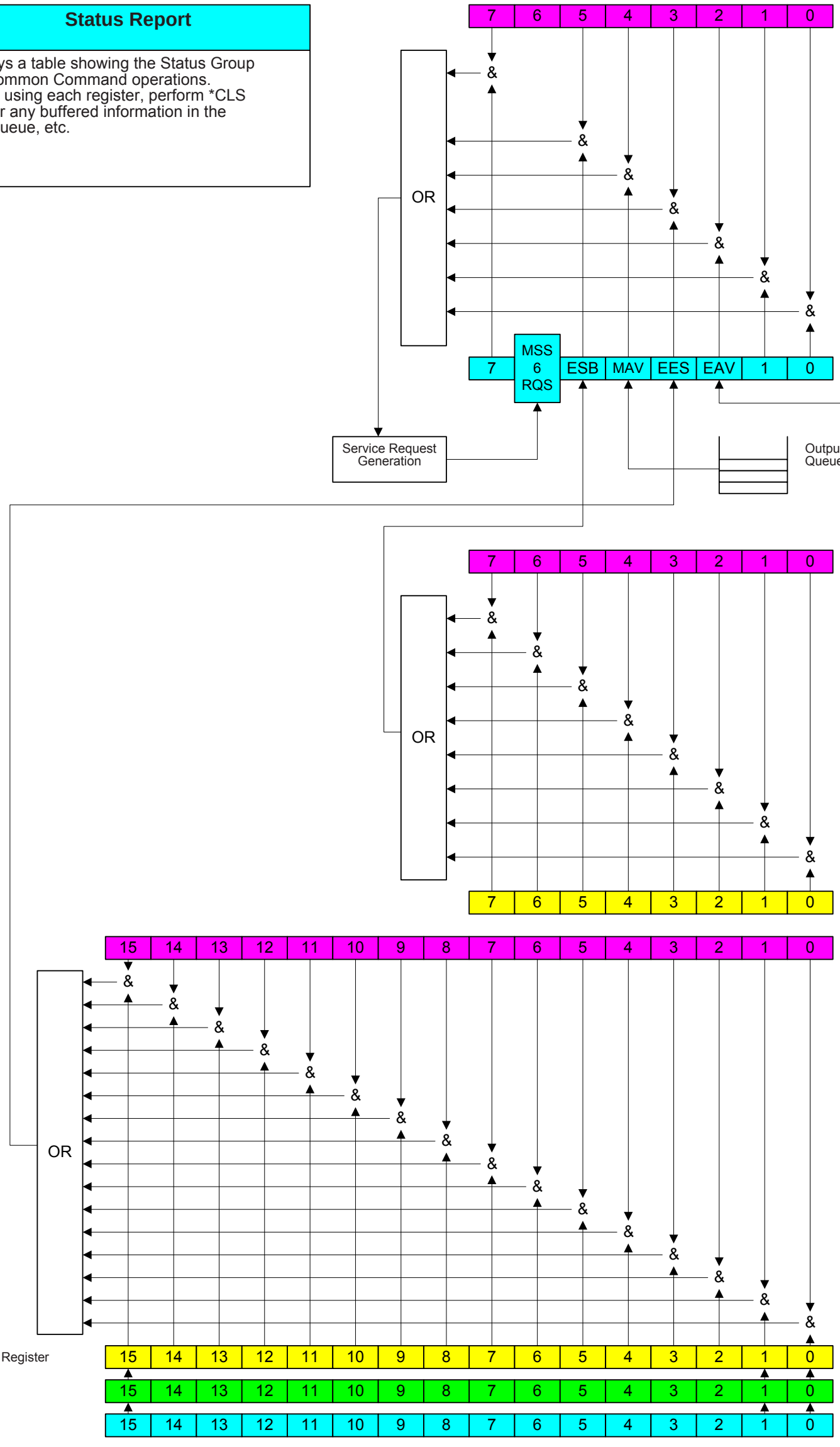
*STB: Read Status Byte

OPT: Read Option Information

SAV: Save Settings

Status Report

Displays a table showing the Status Group and Common Command operations.
Before using each register, perform *CLS to clear any buffered information in the error queue, etc.



No	Error code
1	Illegal setup parameter
2	Current setting not possible
3	No function
4	Conflict with another setting
16	Command error
17	Invalid channel specification
18	Illegal program header
19	No query function
20	Query function only
21	Invalid parameter

Bit:	Function
0:	Not used
1:	Not used
2:	Empty, overflow
3:	Device-dependent error
4:	Execution error
5:	Command error
6:	Not used
7:	Power on

Bit:	Name	Function
0:	REC	Capturing data
1:	MEM	Memory input/output status
2:	WTR	Awaiting trigger status
3:	TRG	Triggered status
4:	-	Not used
5:	ACS	Accessing disk
6:	-	Not used
7:	-	Not used
8:	-	Not used
9:	-	Not used
10:	-	Not used
11:	-	Not used
12:	SET	Executing setup
13:	INI	Executing initialization
14:	CAL	Performing auto balance, calculation between cursors
15:	-	Not used

Command Example

Example 1:	Captured to Device memory. No data received in PC. CH1: Voltage, 1V range, filtered CH2: Temperature, T thermocouple CH3-CH10: Not used Sampling period: 1 second
01. :AMP:CH1:INP DC	Set CH1 input
02. :AMP:CH1:RANG 1V	Set CH1 range
03. :AMP:CH1:FILT ON	Set CH1 filter
04. :AMP:CH2:INP TEMP	Set Ch2 input
05. :AMP:CH2:RANG TCT	Set CH2 thermocouple
06. :AMP:CH3:INP OFF	Set CH3 input Off Set Ch4 to CH10 similarly
07. :DATA:SAMP 1S	Set Sampling period
08. :DATA:CAPT DISK, ” \MEM\TEST.GBD ”	PC card settings. "" indicates location of PC card and file name. (Optional)
09. :MEAS:START	Start capture
==Capture time==	
13. :MEAS:STOP	Stop capture

Example 2:	PC receives all capture data. Trigger is used and only the data after the trigger is captured. See Example 1 for AMP settings. Sampling period: 1 second Trigger: Rising edge of 100 mV
01. :DATASAMP 1S	Set Sampling period
02. :TRIG:COND0:SOUR INTERN :TRIG:COND0:CH:HI,100MV	Set trigger
03. :MEAS:OUTP:HEAD?	Capture header data (When the PC creates a GBD (binary) file that can be handled by the device and the attached application, the header data must to be added to the file head. After the capture, the number of data files and the end time is added to the header.)
04. :MEAS:START	Start capture
05. :MEAS:OUTP:ACK?	Data reception When using the trigger, occasionally check the status of the trigger bit in the data received. When the trigger bit is 0, remove the data as the data is received before the trigger. Capture data to file after the trigger bit turns to 1. As this command sends all data stored in the buffer (up to 1,000 files), it must be executed before the buffer is full.
==Capture time (Repeat 05.)==	
05. :MEAS:STOP	Stop capture

Example 3:	Data received in an arbitrary interval. Data not captured to device. See Example 1 for AMP settings. Sampling period: 100 ms
01. :MEAS:OUTP:ONE?	Receive 1 record
==Time elapsed==	
02. :MEAS:OUTP:ONE?	Receive 1 record
==The same process repeated==