


TV EXPLORER **// // +**

***REMOTE CONTROL
USB COMMANDS***



SAFETY NOTES

Read the user's manual before using the equipment, mainly " SAFETY RULES " paragraph.

The symbol  on the equipment means "SEE USER'S MANUAL". In this manual may also appear as a Caution or Warning symbol.

Warning and Caution statements may appear in this manual to avoid injury hazard or damage to this product or other property.

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REMOTE CONTROL USB COMMANDS

TV EXPLORER **/// // +**

1 REMOTE CONTROL WITH A PC

1.1 Introduction

The design of **TV EXPLORER **/// // +****, based on a microprocessor, allows data to be exchanged between the equipment and a remote controller (personal computer) via an USB connector. It is thus possible to obtain data as well as remote control of the **TV EXPLORER **/// // +**** (measurement mode, video format, DATALOGGER status, etc.) for maintenance purposes and monitoring of installations.

1.2 Protocol for communication between the TV EXPLORER **/// // + and a PC**

This protocol is controlled by software and is using a virtual serial port over an USB interface. Data and information are exchanged using messages consisting of ASCII alphanumerical characters. This method ensures easy carrying between different types of personal computers.

To activate the virtual serial port, a special driver must be installed. The driver is included with the purchased instrument.

Connections

The cable between the **TV EXPLORER **/// // +**** and the **PC** must be a standard **A to B type USB** cable **PROMAX** reference **CC-040** or equivalent.



Figure 1.- USB A-B standard connection cable.

The **TV EXPLORER // // +** accepts remote commands at any time, which the instrument is on, except when in print mode. That is, it is not necessary to put the instrument in special remote control mode; rather, this mode is selected immediately when it detects a complete command during the time necessary for its execution.

The communication protocol is as follows:

- 1.- **TV EXPLORER // // +** transmits a XON code (11H) every second. The aim is to indicate to any possible remote device that the equipment is ready to receive data.
- 2.- At this moment, data streams can be sent it. Each data stream is composed by:
 - a. Stream beginning: '*' (code 2AH)
 - b. Set of characters that describe data message.
 - c. CR (carriage return, code 0DH)
- 3.- Once a data stream has been sent, will be received a XOFF (code 13H) indicating that the transmission is stopped
- 4.- Next, in case of correct message an ACK (acknowledge, code 06H) is expected or a NAK (not acknowledge, code 15H) in the opposite case.
- 5.- If the sent message requires answers it will be sent at this moment.
- 6.- Once completed the data stream transmission, the **TV EXPLORER // // +** will send a XON (code 11H) indicating that already it is prepared to receive a new data stream.

A typical communication chronogram would be as follows:

PC (REMOTE CONTROLLER)		TV EXPLORER // // +	
1)		<-----	XON
2)	*?TV<CR>	----->	
3)		<-----	XOFF
4)		<-----	ACK
5)		<-----	*TV0<CR>
6)	wait ...		
7)		<-----	XON

(all characters are transmitted in ASCII code)

In print mode, as the same port is used as for the data dump to the printer, all data received is rejected and no XON character is transmitted until leaving this mode.

Commands should always be sent in capital letter and cannot be edited online, i.e., once a character is received it is stored in the **TV EXPLORER // // +** buffer and cannot be rectified by sending an erase code.

Commands in remote control are divided in to two groups, orders and interrogations. Orders modify a variable or the equipment status. Interrogations respond with information concerning equipment status or the value of a variable. For interrogative command, it is necessary to add the character '?' after the character '*'.

1.3 Power on using USB port

The equipment can start up being stopped, by means of the USB port. Following the steps:

- 1.- Send 5 asterisks. '*****'
- 2.- Wait for 1 second.
- 3.- Send '**'

Next, will be described the set of commands that the **TV EXPLORER // / // +** accepts. All commands are transmitted in ASCII code.

1.4 Remote commands

NOTE 1: The (') character should not be sent; it is only included in the description in order to define the string that makes up the remote command.

NOTE 2: The values given in small letter are parameters that change in value depending on the function to be executed. These values are always decimal or hexadecimal ASCII characters. For example, to transmit the value '1', we must send the hexadecimal code 31 that corresponds to this character. Consult the text for acceptable value margins. The transmission of erroneous parameters or contradictory information may cause **TV EXPLORER // / // +** to stop operating correctly. In this case, it is necessary to reset the equipment by shortly switching it off.

IMPORTANT REMARK:

In the case of transmitting to the **TV EXPLORER //** a command corresponding to some **nonavailable function**, this one will generate a run time error.

- Command: **'*'** **NULL Command. Tests communication.**

Syntax:

Interrogation: **'*<CR>'**

Response: **'ACK'**

- Command: **'AI'** **Interrogates if the program is auto-identifying some signal or not.**

Syntax:

Interrogation: **'*?AI<CR>'**

Response: **'*Aix<CR>'**

Where:

x =

- 0:** Not carrying out auto-identification.
- 1:** Auto-identification in progress.

- Command: **'AP'** **Activates / deactivates the Auto Power Off function. Also, it allows to set the timer for this function.**

Syntax:

Selection: **'*APsxxx<CR>'**

Where:

s =

- 'A':** Turns on the Auto Power Off function.
- 'M':** Turns off the Auto Power Off function.
- 'T':** Allows to modify the Auto Power Off timer when this function is activated.

xxxx = Time in minutes to Power Off.

Example:

- '*APA<CR>'** Turns on the Auto Power Off function.
- '*APM<CR>'** Turns off the Auto Power Off function.
- '*APT0010<CR>'** Sets to 10 minutes the auto power off timer.

- Command: 'AT' Selects / interrogates the attenuators

Syntax:

Attenuator selection: '*ATa<CR>'

Interrogation: '*?AT<CR>'

Response: '*ABba<CR>'

Where:

b =

A: Auto
M: Manual

a =

00: 0dB
10: 10dB
20: 20dB
30: 30dB
40: 40dB
50: 50dB
60: 60dB

Example:

'*?AT<CR>'

'*ATM40<CR>'

'*ATA20<CR>'

Manual attenuator value = 40 dB.

Automatic attenuator current value = 20 dB.

Note: When the attenuators are set to manual also is operative in the spectrum analyser mode. Therefore, whether the reference level is modified the attenuator remains unchanged.

English

- Command: **'AU'** **Selects the type of signal to be identified in terrestrial and satellite bands when the auto-identification process is carried out.**

Syntax:

Selection: **'*AUbs<CR>'**

Where:

b =

'T': Terrestrial identification.

'S': Satellite identification.

s =

'C': COFDM signal will be identified.

'Q': Satellite identification.

Example:

'*AUTC<CR>' Sets COFDM as signal to identify.

- Command: **'BW'** **Selects / interrogates the measurement filter bandwidth.**

Syntax:

Interrogation: **'*?BW<CR>'**

Response: **'*BWxxxxx<CR>'**

Selection of the bandwidth: **'*BWxxxxx<CR>'**

Where:

xxxxx = bandwidth in kHz

- Command: 'CB' Provides the CBER measurement value. If the instrument is not configured to measure CBER, then it will be return NACK.

Syntax: '**?CB<CR>'

Response: '**CBcsm₂m₁Ese₁e₂<CR>'

Where:

c =

" = "	Correct measurement
" > "	Overrange
" < "	Underrange
" ! "	Measurement can not be carried out.

s =

" + "	Positive value measurement.
" - "	Negative value measurement.

m₂m₁ = Mantissa decimal value.

m₂:	High nibble.
m₁:	Low nibble.

E = Exponent

e₁e₂ = Exponent value

Example:

'**?CB<CR>'
'**CB=+12E-07<CR>'

- Command: 'CN' Provides the C/N measurement value. If the instrument is not configured to measure C/N, then it will be return NACK.

Syntax: '**?CN<CR>'

Response: '**CNcsl₂l₁l₀<CR>'

Where:

c =

" = "	Correct measurement
" > "	Overrange
" < "	Underrange
" ! "	Measurement cannot be carried out.

s =

" + "	Positive value measurement.
" - "	Negative value measurement.

l₂l₁l₀ = Measurement in dB decimal notation.

l₂:	High nibble.
l₀:	Low nibble.

English

- Command: 'CO' Provides / Configures the instrument current constellation.

Syntax:

Interrogates about constellation: '**?CO<CR>'

Response / Configures: '**COxx<CR>'

Where:

xx =

'0':	QPSK COFDM
'1':	16QAM COFDM
'2':	64QAM COFDM
'3':	16QAM QAMA
'4':	32QAM QAMA
'5':	64QAM QAMA/QAMB
'6':	128QAM QAMA
'7':	256QAM QAMA/QAMB
'8':	QPSK DVB-S/DSS/DVB-S2
'9':	8PSK DVB-S2

- Command: 'CP' Selects a channel plan.

Syntax:

Selection: '**CPTypename<CR>'

Where:

Type = Two chars

'00':	Terrestrial channel plan as reference. Cannot be removed.
'01':	Read only terrestrial channel plan. Cannot be removed.
'02':	Read/write terrestrial channel plan. Can be modified and removed.
'03':	Satellite channel plan as reference. Cannot be removed.
'04':	Read only satellite channel plan. Cannot be removed.
'05':	Read/write satellite channel plan. Can be modified and removed.

Name = Channel plan name. Max. 12 chars.

Example:

'*CP04EUT13-HH<CR>' Selects EUT13-HH as satellite channel plan.

- Command: 'CR' **Selects / Interrogates the code rate. When the instrument is working in a mode with no sense will return NACK.**

Syntax:

Code rate interrogation: **'*?CR<CR>'**

Response: **'*CRxx<CR>'**

Code rate selection: **'*CRxx<CR>'**

Where:

xx =

'00': 1/2
'01': 2/3
'02': 3/4
'03': 4/5
'04': 5/6
'05': 6/7
'06': 7/8
'07': 1/4
'08': 1/3
'09': 2/5
'10': 3/5
'11': 8/9
'12': 9/10

English

- Command: 'DS' **Sends the DiSEqC program commands.**

Syntax:

Selection: **'*DSnameprogram<CR>'**

Where:

nameprogram = Name of the DiSEqC program to send

Example:

'*DSSAT A<CR>' Sends the "SAT A" program.

- Command: 'EM' **Selects the equipment operating mode. The equipment can operate in the following modes:**

- NULL Stand by to attend remote control commands
- TV TV receiver showing pictures
- SIG. ANALYSER Signal TV analyser
- SPECTRUM Spectrum analyser
- ANTENNA Antenna alignment
- IDENTIFY Signal identification
- CONSTEL. Constellation diagram

Syntax:

Selection: '*EMm<CR>'

Where:

m =

- '0': NULL task.
- '1': TV.
- '2': SIGNAL ANALYSER.
- '3': SP.
- '4': ANTENNA ALIGNMENT.
- '5': IDENTIFY.
- '9': MODE CONSTELLATION.

Example:

'*?EM<CR>' Interrogates the current equipment mode.
'*EM1<CR>' Answer is TV mode.

- Command: 'FM' **Provides the FM deviation measurement value.**

Syntax: '*?FM<CR>'

Response: '*FMcsI₂I₁I₀<CR>'

Where:

c =

- "=": Correct measurement
- ">": Overrange
- "<": Underrange
- "!": Measurement cannot be carried out.

s =

- "+": Positive value measurement.
- "-": Negative value measurement.

I₂I₁I₀= Measurement in kHz decimal notation.

- I₂: High nibble.
- I₀: Low nibble.

- Command: 'FR' **Selects / interrogates the frequency (with the consequent change).**

Syntax:

Frequency selection: '*FRxxxxxx<CR>'

Frequency interrogation: '**?FR<CR>'

Response: '*FRxxxxxx<CR>'

Where:

xxxxxx = 7 digits value in kHz decimal notation that represents the frequency to synthesise.

Example:

'*FR0655250<CR>' Synthesises the 655.25 MHz frequency.

- Command: 'GI' **Selects / interrogates the Guard Interval. When the instrument is working in a mode with no sense will return NACK.**

Syntax:

Guard Interval interrogation: '**?GI<CR>'

Response: '**Glx<CR>'

Selection: '*Glx<CR>'

Where:

x =

'0': 1/ 4

'1': 1/ 8

'2': 1/ 16

'3': 1/ 32

- Command: 'LA' **Selects the operating language.**

Syntax:

Selection: **'*LAxx<CR>'**

Where:

xx =

- '1': English
- '2': Spanish
- '3': French
- '4': German
- '5': Italian
- '6': Catalan
- '7': Russian
- '8': Portuguese
- 'FF': Language will be marked as not initialised, and when booting will appear the language selection screen.

- Command: 'LV' **Provides the absolute level, filtered and compensated, in dB μ V decimal notation (for LEVEL and DIGITAL measurement modes) and in dB decimal notation (for VIDEO / AUDIO and CARRIER / NOISE measurement modes).**

Syntax:

Command: **'*?LV<CR>'**

Response: **'*LVcsI₂I₁I₀<CR>'**

Where:

c =

- '=': Correct measurement
- '>': Overrange
- '<': Underrange
- '!': Measurement can not be carried out

s =

- '+' : Positive measurement
- '-' : Negative measurement
- I₂I₁I₀: Decimal measurement in dB μ V decimal notation.
 - I₂: High nibble
 - I₀: Low nibble

The command measurement return corresponds to the measurement configuration settings as a result of executing the **MC** command. The return value is according the following table:

ANALOGUE TERRESTRIAL			
LEVEL	AUDIO	NOISE	*?LV
Activated	Activated	Activated	Returns video carrier in dB μ V decimal notation.
Deactivated	Activated	Activated	Returns audio carrier in dB μ V decimal notation.
Deactivated	Deactivated	Activated	Returns noise measurement
DIGITAL TERRESTRIAL			
LEVEL		NOISE	*?LV
Activated		Activated	Returns main carrier in dB μ V decimal notation.
Deactivated		Activated	Returns noise in dB μ V decimal notation.
DIGITAL SATELLITE			
LEVEL		NOISE	*?LV
Activated		Activated	Returns main carrier in dB μ V decimal notation.
Deactivated		Activated	Returns noise in dB μ V decimal notation.
ANALOGUE SATELLITE			
LEVEL		NOISE	*?LV
Activated		Activated	Returns video carrier in dB μ V decimal notation.
Deactivated		Activated	Returns noise in dB μ V decimal notation.

English

- Command: 'LB' Selects the external unit power (LNB).

Syntax:

Voltage selection: '*LBI<CR>'

Where:

I =

- 0: EX
- 1: 5 V
- 2: 13 V
- 3: 15 V
- 4: 18 V
- 5: 24 V
- 6: 13 V + 22 kHz
- 7: 18 V + 22 kHz

Example:

'*LB0<CR>' Selects the external power supply

- Command: 'ME' Provides the MER measurement value. If the instrument is not configured to measure MER, then it will be return NACK.

Syntax: '**ME<CR>'

Response: '**MEcsl₂l₁l₀<CR>'

Where:

c =

"=": Correct measurement
">": Overrange
"<": Underrange
"!": Measurement cannot be carried out.

s =

"+": Positive value measurement.
"-": Negative value measurement.

l₂l₁l₀=

Measurement in dB decimal notation.
l₂: High nibble.
l₀: Low nibble.

- Command: 'MO' Selects / interrogates the COFDM carrier number. When the instrument is working in a mode with no sense will return NACK.

Syntax:

Carrier number interrogation: '**MO<CR>'

Response: '**MOx<CR>'

Selection: '**MOx<CR>'

Where:

x =

'0': 2k
'1': 8k
'2': 4k

- Command: 'NA' Returns the name of the equipment.

Syntax:

Interrogation : '**?NA<CR>'

Response: '**NA "INSTRUMENT_NAME"<CR>'

Example:

(PC) '**?NA<CR>'

(Instrument) '**NA TVEXPLORERII<CR>'

- Command: 'NI' Interrogates the value of the external unit current (LNB).

Syntax:

Interrogation: '**?NI<CR>'

Response: '**NI I₃I₂I₁I₀<CR>'

Where:

I = external unit current in mA, in decimal notation.

d₃: High nibble

d₀: Low nibble

- Command: 'NL' Interrogates the value of the external unit voltage (LNB).

Syntax:

Interrogation: '**?NL<CR>'

Response: '**NL I₂I₁I₀<CR>'

Where:

I = External unit voltage in tens of volts.

I₃: High nibble

I₀: Low nibble

- Command: 'OF' Turns off the unit.
Note: The instrument cannot be turned on remotely.

Syntax:

Selection: '**OF<CR>'

English

- Command: **'RA'** **Selects / interrogates the Symbol Rate. When the instrument is working in a mode with no sense will return NACK.**

Syntax:

Interrogation: **'*?RA<CR>'**

Response: **'*RAxxxxx<CR>'**

Selection: **'*RAxxxxx<CR>'**

Where:

xxxxx = Symbol Rate in kbps

- Command: **'SA'** **Selects / interrogates the measurement type to analyse (signal analyser).**

Syntax:

Signal analyser interrogation: **'*?SA<CR>'**

Response: **'*SAs<CR>'**

Selection: **'*SAs<CR>'**

Where:

s =

'0': ANALOGUE
'1': COFDM
'2': QAM-A
'3': QPSK
'4': DSS
'5': 8VSB
'6': QAM-B
'7': DVB-S2
'8': FM

- Command: 'SC' **Selects the SCART operating mode.**

Syntax:

Selection: '**SCx<CR>'

Where:

x =
 'I': Input mode
 'O': Output mode
 'A': Automatic mode

Example:

'*SCI<CR>' Selects SCART input mode.

- Command: 'SI' **Selects / interrogates the Spectral Inversion.**

Syntax:

Spectral Inversion interrogation: '**?SI<CR>'

Response: '**SIx<CR>'

Spectral Inversion selection: '**SIx<CR>'

Where:

x =
 '0': OFF
 '1': ON

English

- Command: 'SL' **Selects / interrogates information about a service from service list. (Digital mode)**

Syntax:

Service selection: '**?SLn₁n₀<CR>'

Where:

N₁N₀: Last service number in hexadecimal notation.
n₁n₀: Number of service sorted from DVBNET service list in hexadecimal notation. (First service from list is '00')
n₁: High nibble.
n₀: Low nibble.

Current service interrogation: '**?SL<CR>'

Response: '**SLn₁n₀<CR>'

Where:

- n_1n_0 :** Number of service sorted from DVBNET service list in hexadecimal notation, currently selected. (First service from list is '00')
- n_1 :** High nibble.
- n_0 :** Low nibble.

General service interrogation: '*?SL n_1n_0 <CR>'

Where:

- n_1n_0 :** Number of service sorted from DVBNET service list in hexadecimal notation. (First service from list is '00')
- n_1 :** High nibble.
- n_0 :** Low nibble.

Response: '*SL $N_1N_0n_1n_0SbL_1L_0$ [service name]
L $_1L_0$ [provider name] <CR>'

Where:

- N_1N_0 :** Number of services.
Particular case: **N_1N_0** = '!!' or '00' indicates that the acquisition process of service list has not finalized.
- n_1n_0 :** Last service number in hexadecimal notation.
(First service from list is '00')
- n_1 :** High nibble.
- n_0 :** Low nibble.
- L $_1L_0$:** Indicates the following field size in hexadecimal notation.
- [service name]=** ASCII character string with the service name.
- [provider name]=** ASCII character string with the provider name.
- S:** Service type indication.
- b = '0':** Service without video nor audio contents.
- b = '1':** Service with video and/or audio contents.
- b = '2':** Service with video and/or audio contents but one or all are encrypted.
- b = '!':** Video/Audio detection process in progress.

- Command: 'SLC' **Returns the percentage of MPEG-2 service list capture. Read only command.**

Syntax:

Interrogation: '**?SLC<CR>'

Response: '**SLCc₁c₀<CR>'

Where:

c₁c₀ = Percentage in hexadecimal notation.
 '00': Turns on the Auto Power Off function.
 '0x64': Turns off the Auto Power Off function.
 If any type of problem occurs during the capture process this indication could back to '00' and begins afresh.

- Command: 'SR' **Selects the spectrum reference level.**

Syntax:

Selection: '**SRx<CR>'

Where:

x = Reference level value in dB.

Example:

'*SR120<CR>' Selects a reference level of 120 dB.

English

- Command: 'SS' **Selects the span in the spectrum analyser mode.**

Syntax:

Selection: '**SRx<CR>'

Where:

x = Span value in MHz.
 'X': FULL

Example:

'*SS100<CR>' Selects a 100 MHz span.
 '*SSFULL<CR>' Selects a FULL span.

- Command: **'ST'** **Provides the digital demodulator current status.**

Syntax:

Interrogation: **'*?ST<CR>'**

Response: **'*STx<CR>'**

Where:

x =

'0': No locked
'1': Locked DVB-T
'2': Locked DVB-H
'3': Locked 8-VSB
'4': Locked QAMA
'5': Locked QAMB
'6': Locked DVB-S
'7': Locked DVB-DSS
'8': Locked DVB-S2
'9': Locked 8-VSB

- Command: **'SY'** **Selects / Interrogates the TV system (standard + colour).**

Syntax:

Standard selection: **'*SYys<CR>'**

Note: When the instrument is in digital mode, the standard must be 0x0 (hex.)

Example in digital mode:

'*SY00<CR>' Selects the DIGITAL TV PAL.
'*SY10<CR>' Selects the DIGITAL TV SECAM.
'*SY20<CR>' Selects the DIGITAL TV NTSC.
'*SY11<CR>' Error due to BG does not exist in DIGITAL.

Example in analogue mode:

'*SY11<CR>' Selects the SECAM + BG.
'*SY24<CR>' Selects the NTSC + M.
'*SY10<CR>' Error due to standard is necessary in analogue mode.

Note: When the instrument is in analogue satellite digital mode, cannot be programmed system and standard.

Standard interrogation: **'*?SY<CR>'**

Response: **'* SYys<CR>'**

Where:

ys = (standard in hexadecimal notation)

0x00:	(00 dec) PAL WITHOUT TV STANDARD
0x01:	(01 dec) PAL_BG
0x02:	(02 dec) PAL_DK
0x03:	(03 dec) PAL_I
0x04:	(04 dec) PAL_M
0x05:	(05 dec) PAL_N
0x10:	(16 dec) SECAM WITHOUT TV STANDARD
0x11:	(17 dec) SECAM_BG
0x16:	(22 dec) SECAM_L
0x12:	(18 dec) SECAM_DK
0x20:	(32 dec) NTSC WITHOUT TV STANDARD
0x24:	(36 dec) NTSC_M

Example:

***SY16<CR>**

Selects the SECAM_L standard.

- Command: **'VB'** Provides the VBER measurement value. If the instrument is not configured to measure VBER, then it will be return NACK.

Syntax: ****?VB<CR>**

Response: ****VBcsm₂m₁Ese₁e₂<CR>**

Where:

c =

" = "	Correct measurement
" > "	Overrange
" < "	Underrange
" ! "	Measurement cannot be carried out.

s =

" + "	Positive value measurement.
" - "	Negative value measurement.

m₂m₁ =

Mantissa decimal value.

m₂: High nibble.

m₁: Low nibble.

E =

Exponent

e₁e₂ =

Exponent value

Example:

****?VB<CR>**

****VB=+12E-07<CR>**

English

- Command: 'VE' **Returns the version.**

Syntax:

Interrogation : '**?VE<CR>'

Response: '**VE"STRING_VERSION"<CR>'

Example:

(PC) '**?VE<CR>'

(Instrument) '**VE V1.13<CR>'

- Command: 'VF' **Selects / interrogates the video format.**

Syntax:

Interrogation: '**?VF<CR>'

Response: '**VFx<CR>'

Selection: '**VFx<CR>'

Where:

x =

'0': 4:3

'1': 16:9

'A': Automatic

REMARK

The **TV EXPLORER /// ++** incorporates a system to detect incompatible functions and so it only will accept the functions described in this paragraph if they are compatible with its state. In this case you will obtain as answer a NOT ACKNOWLEDGE' code.

Commands version: v1.05