

PROLINK

A BIG FAMILY

The PROLINK series of **PROMAX** Signal Level Meters are an ideal solution for those companies that need multifunctional equipment for installation, certification and maintenance purposes in terrestrial, cable and satellite television or data systems. Due to the type of measurements performed and its accuracy, these instruments are adequate for quality assurance both in analogue and digital systems.

They are durable and light at the same time and built for rough field use in all kinds of weather.

They have a very intuitive user interface which allows for quick learning in the use of all their functions. They have an icon-based keyboard and multi-lingual onscreen menus.



ALL IN ONE

PROLINK-4



RECOMMENDED APPLICATION	PROLINK-2	PROLINK-3+	PROLINK-4
Terrestrial	Included	Included	Included
Digital Terrestrial (DVB-T)	–	Optional	Included
Cable	(No return path)	Included	Included
Digital Cable (DVB-C)	–	Optional	Included
Satellite	Included	Included	Included
Digital Satellite (DVB-S)	Included	Optional	Included
MPEG decoding	–	–	Included
Conditional access	–	–	Optional
B&W or colour screen	(B&W only)	Included	Included
Li-Ion long operating time battery	–	Optional	Included

PROLINK-4

The **PROLINK-4** incorporates functions to determine the quality of both analogue and digital signals. For analogue signals the measurements are Level, Video/Audio, Carrier/Noise and for digital signals Channel Power, Carrier / Noise, Bit Error Rate and DVB Digital Channel Identification (DCI).



TOMORROW'S ENGINEERING



Digital Satellite (QPSK DVB-S)

The **PROLINK-4** measures BER before and after Viterbi (also known as FEC). It also includes the DCI function, patented by PROMAX, which allows for a fully automatic identification of the tuned channel.

The Bit Error Rate measurement before the first correction stage (Viterbi) is most sensitive to changes in the reception quality. Measurement after Viterbi can be compared with quality limits required by DVB and defined by the Quasi Error Free (QEF) threshold.

Digital Cable (QAM DVB-C)

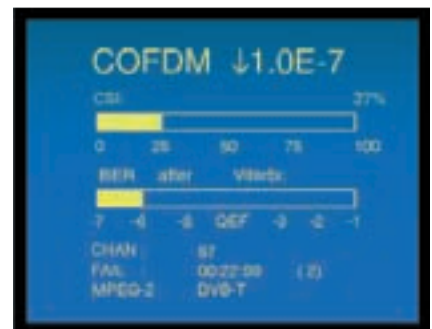
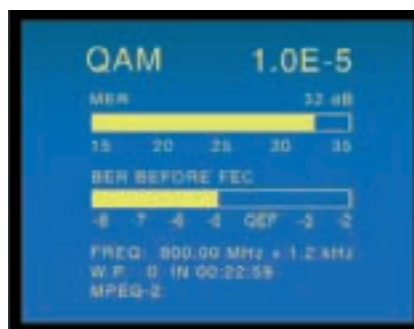
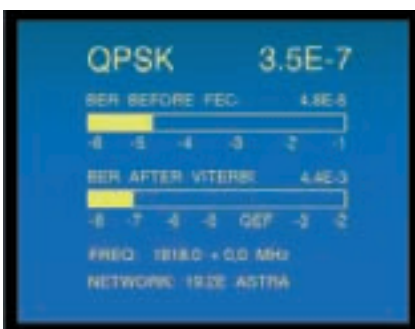
Both BER and MER can be measured on QAM digital signals. It also includes the DCI function.

The BER, as in the case of QPSK or COFDM, can be compared to DVB quality limits. In QAM it is also interesting to use another parameter which is representative of quality and brings complimentary information mostly when quality of signals is high. MER will display better than BER an improvement in a good quality signal.

Digital Terrestrial (COFDM DVB-T)

The **PROLINK-4** can measure both the BER to compare with quality limits and the CSI.

The CSI (Channel Status Information) gives a very valuable information about the quality of the multiple carriers the COFDM channels are made of. CSI value must be as low as possible and helps to determine which is the safety margin to ensure proper reception. This is especially interesting if some changes such as those related to the weather can be expected.



FOR TODAY'S APPLICATIONS

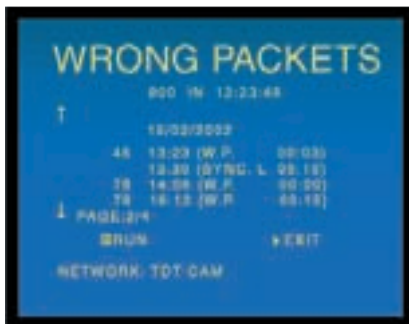
PROLINK-4

Dynamic quality analysis

When the BER measurement is indicating an acceptable reception quality and the DCI information is displaying the channel we are looking for, we are ready to request the analysis of the MPEG-2/DVB Transport Stream Wrong packets.

The equipment stores the transmission cuts and the type of event that has produced them. An example based on the information is displayed on the following screenshot: the demodulator has detected 45 events of W.P., that is to say incorrigible packets, starting at 13:23 and within an interval of 3 minutes time.

The events registered according to the ETSI TR 101 209 Standard.



DTV	Digital television service
DR	Digital radio sound service
DAT	Data broadcast service
MOS	Mosaic service
-	Operator reserved type



Service List

As a result of demodulating the QPSK, QAM or COFDM digital signal what we could relate to a baseband digital signal is obtained which is a sequence of bytes named "Transport Stream". These bytes are structured in packets and tables. Some of these tables are of special interest, such as the NETWORK Identification Table, the BOUQUET Association Table and the SERVICE Description Table.



Encrypted Channels

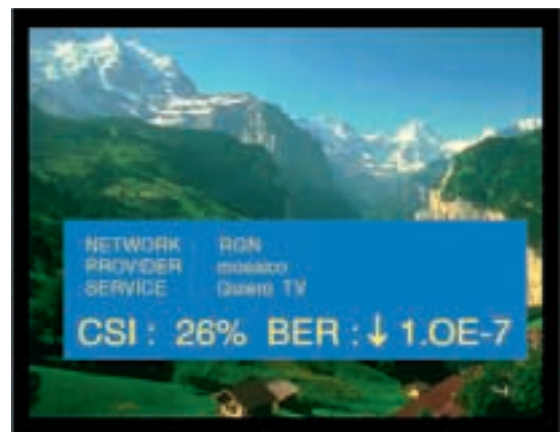
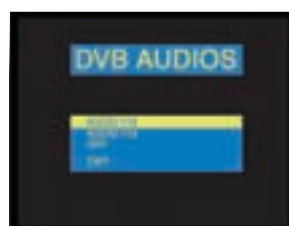
The equipment also has a Smart Card reader incorporated. As an option, there is the possibility to upgrade the **PROLINK-4** with the capability to display programs encrypted with conditional access systems such as Viaccess, Mediaguard, Conax...



When available the complete Service List will be displayed along with the information on the type of service, and with an asterisk (*) in those cases where the operator is indicating this particular service is totally or partially encrypted.

MPEG-2 Digital Picture

The **PROLINK-4** has a MPEG-2 decoder built-in. This module allows to view all free to air programs in a digital transponder, including demodulation of video and audio contents.



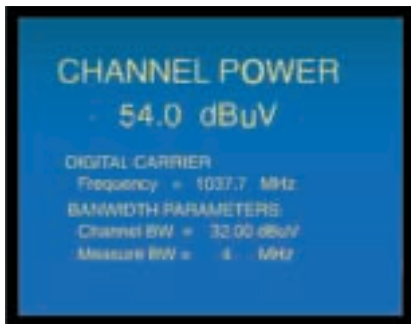
PROLINK-4

TOP IN ITS CLASS



Digital channel power

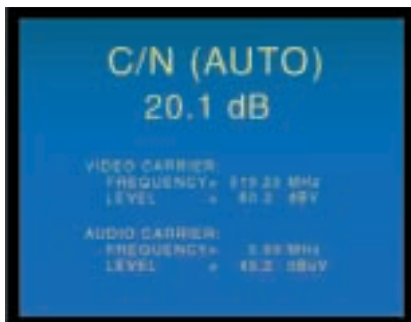
The CHANNEL POWER of a digital signal can be calculated by averaging out or by taking into consideration the spectral distribution of



the signal. The first method has the advantage of being very quick. The second determines signal power with greater precision, especially for degraded digital signals. **PROLINK-4** uses both.

Measuring Carrier/Noise (C/N)

Measuring the C/N ratio is essential to certify the immunity of a TV installation against noise, whether analogue or digital. With the

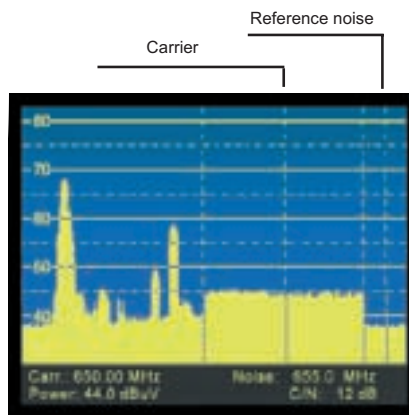


PROLINK-4 the user can perform this measurement either in AUTO or REFERENCED mode.

In AUTO mode, the **PROLINK-4** automatically defines the frequency to measure the noise.

In REFERENCED mode, it is the user who defines the frequency where the noise level is to be measured.

This mode is particularly useful for calculating the Carrier/Noise ratio in environments with a



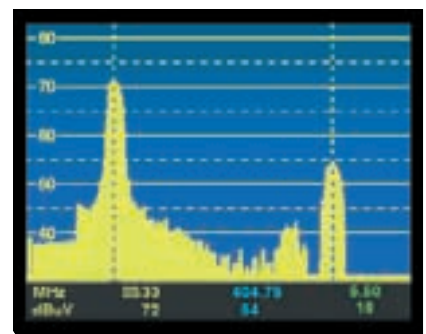
Fast, calibrated and simple Spectrum Analyser

As a spectrum analyser the **PROLINK-4** has been optimised for measurements in television systems. The instrument allows selection of Frequency Range (Span), Reference Level and Sweep Time. These parameters can be adapted for an optimum signal representation in accordance with the type of measurement to be done. For example, when using the equipment to align an antenna, it is very useful to select the Sweep Time as Fast or directly choose the Antenna Alignment function in order that the display follows closely every change in the behaviour of the signal.

On the other hand, if the representation must show signal evolution accurately, for example

in a Cable TV system, it will be more appropriate to select the Accurate sweep mode.

When DUAL MARKER mode is selected, two



markers appear on the screen with indication of level and frequency gap between them. With 50 dB dynamic range, frequency or channel and level indication simultaneously on the screen the interpretation of the readings is immediate.

At any time it is possible to obtain a printed copy of the spectrum display.

On selecting the measurement of a digital signal, the cursors automatically place themselves to measure channel power at both ends of the channel, according to the selected BW (8 MHz in the example).

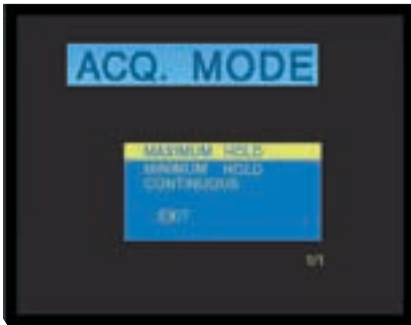


STILL AFFORDABLE

PROLINK-4

Return Path measurements

There are applications such as noise or interference detection in the return path where it is very interesting to have the possibility to change the spectrum analyser acquisition mode so that signal minimum's or maximum's taking place in a given time period can be displayed.



DiSEqC 1.2

DiSEqC 1.2 compatible devices such as LNBs, switches, positioners, etc... can be controlled by means of this function.



Both **PROLINK-2** and **PROLINK-3** have the possibility to make a sequence of commands which can be executed or edited at any time.

In addition **PROLINK-4** can store up to 10 programs with various combinations or sequences of commands.

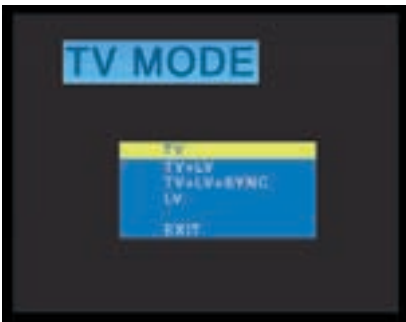


Teletext

The Teletext is an information contained inside the analogue television signal itself. It is very sensitive to noise and therefore it is very useful to evaluate the quality of an installation.

TV, LV, SYNC Modes

Additional to the television monitor operation the **PROLINK-4** can work in TV mode as an analogue signal level indicator and can display the line synchronism pulse just like it would appear on an oscilloscope screen.



Acquisition and data processing

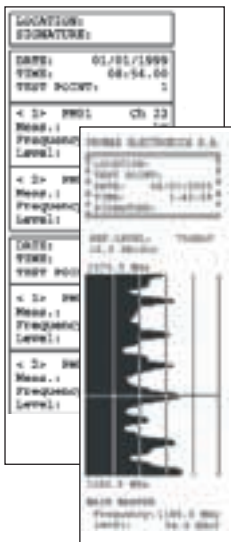
The **PROLINK-4** can be used as a data acquisition system. It can analyse up to 99 channels at any one particular outlet with just a command. It can make many kinds of measurements including Bit Error Ratio. The process can be repeated for up to 99 outlets since the capacity of the system is 9.801 measurements.

It is also possible to repeat measurements over time. In this mode the instrument will take sets of measurements every given time interval. This function can be very useful for permanent monitoring of signals or intermittent faults location. With the help of the **RM-104** software package all data can be downloaded to a computer to be analysed with more detail.



Line synchronism + level + TV

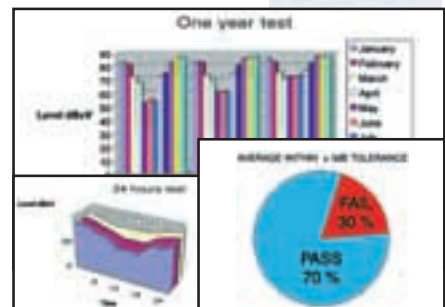
Qualitative analysis of TV signal quality as it will be watched is possible based on line synchronism display.



The results can be stored in the memory or also transferred to a printer to obtain reports right in the place where the measurements are made. For this purpose the **CI-023** printer can be attached to the instrument's carrying bag.

It is possible to print both data lists and the spectrum display.

Various types of reports, graphics or statistics can be generated using a standard spreadsheet or any other data processing software.



PROLINK-4

ADVANCED TECHNOLOGY

TUNING Tuning modes Channel plan Resolution Automatic search Memory	Digital frequency synthesis. Continuous tuning from 5 to 862 MHz and from 900 to 2150 MHz Frequency, Channel or Memory Configurable 5-862 MHz: 50 kHz 900-2150 MHz: 500 kHz Threshold level selectable 99 positions	Sound Input Outputs Demodulation	Scart Built in speaker, Scart AM, FM, TV and NICAM (PAL BG, I and SECAM L), selectable
		Digital Measuring COFDM Tuning Level Parameters Carriers QAM Tuning Level Parameters Demodulation Symbol rate QPSK: Tuning Level Parameters Symbol rate Wrong packets	from 40 to 870 MHz (Bw = 8, 7, 6 MHz) 45 dB μ V to 100 dB μ V BER after Viterbi CSI (Channel Status Information) 2k / 8k (Selected by the user). Modulation QPSK, 16-QAM, 64-QAM from 47 MHz to 862 MHz from 45 dB μ V to 110 dB μ V BER before FEC (Forward Error Correction) MER (Modulation Error Ratio) 16/32/64/128/256 QAM 1 to 7 Mbauds from 950 MHz to 2150 MHz 44 dB μ V to 114 dB μ V BER before Viterbi BER after Viterbi from 2 to 45 Mbauds Wrong packets over time ETSI TR 101 290 levels 1.1, 1.2, 1.3 and 2.1
RF Input Impedance Connector Maximum signal	75 Ω BNC, F or TV adapter 130 dB μ V	DCI Function	DVB channel identifier
Level measurement Measurement range Terrestrial TV & FMbands Satellite TV band Reading Analogue Measurement bandwidth Audible indicator Accuracy Sub-band Terrestrial bands Satellite band	20 dB μ V to 120 dB μ V (10 μ V to 1 V) 30 dB μ V to 120 dB μ V (31,6 μ V to 1 V) Auto-range, Absolute value calibrated in dB μ V, dBmV or dBm Analogue bar on the screen 230 kHz (Terrestrial band) + 4 MHz (Satellite band) A tone with pitch proportional to signal strength ± 1.5 dB (30-120 dB μ V, 5-45 MHz) (22°C \pm 5°C) ± 1.5 dB (30-120 dB μ V, 48,25-862 MHz) (22°C \pm 5°C) ± 1.5 dB (40-100 dB μ V, 900-2150 MHz) (22°C \pm 5°C)		Digital video Format Conditional access Viaccess Viaccess + Mediaguard Viaccess + Conax Baseband signal transport Stream interface Input
Measurements in TV modes Terrestrial bands Analogue channels Digital channels Satellite ban Analogue channels Digital channels ACQUISITION function	Level, Video-Audio ratio and Carrier/Noise ratio (Auto and Referenced) Channel power (Auto) and Carrier/Noise ratio (Auto and Referenced). Level and Carrier/Noise ratio (Auto and Referenced) Channel power (Auto) and Carrier/Noise ratio (Auto and Referenced) Automatic acquisition of up to 9801 measurements	Teletext	Decodes at 1.5 level
Spectrum analyser Satellite band Terrestrial bands Measurement bandwidth Terrestrial Satellite Span Terrestrial Satellite Markers Measurements Terrestrial bands Analogue channels Digital channels Satellite band Analogue channels Digital channels	30 dB μ V to 120 dB μ V (31.6 μ V to 1 V) 20 dB μ V to 120 dB μ V (10 μ V to 1 V) 230 kHz, 1 MHz selectable 230 kHz, 4 MHz selectable Full span (full band) - 500 - 200 - 100 - 50 - 32 - 16 - 8 MHz selectable Full span (full band) - 500 - 200 - 100 - 50 - 32 MHz selectable 2 with level, frequency, level difference and frequency difference indications Level, Video-Audio ratio and Carrier/Noise ratio (Referenced). Channel power (Integration method) and Carrier-Noise ratio (Referenced) Bit Error Rate (BER) Level and Carrier/Noise ratio (Referenced) Channel power (Integration method) and Carrier-Noise ratio (Referenced) Bit Error Rate (BER)	Interface	RS-232C
Monitor Display Monitor Colour system TV standard	4,5" B&W CRT (PROLINK-4) 4,5" colour LCD (PROLINK-4C) PAL, SECAM and NTSC M, N, B, G, I, D, K and L	External unit power Terrestrial Satellite 22 kHz signal Maximum power	Through the RF input connector External or 13/15/18/24 V External or 13/15/18 V Selectable 5 W
Video Signal External video input Video output	Scart Scart	DiSEqC Generator	According to DiSEqC 1.2 standard
		Power Supply Internal Battery Autonomy (PROLINK-4C) Recharging time External Voltage Consumption	7.2 V 11 Ah Li-Ion battery Over 3 hours with LNB Over 2 hours with LNB and MPEG-2 4 h starting from a complete discharge (instrument turned off) 12 V 51 W
		Operating environmental conditions Altitude Temperature range Max. relative humidity	Up to 2000 m From 5 to 40°C 80 % (up to 31°C), decreasing lineally up to 50% to 40°C.
		Mechanical features Dimensions Weight	294 (W) x 94 (H) x 274 (D) mm (without rubber protector) 5.1 kg

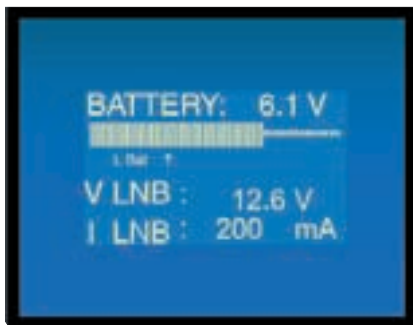
FOR ROUGH USE

PROLINK-4

Li-Ion long operating time batteries

The PROLINK-4 comes with the latest generation batteries (Li+) which allow for an operating time over 3 hours even supplying power to external devices.

It is possible to check the remaining power available from the batteries at any time. This function is combined with the measurement of the voltage and current being supplied to the external devices.



Another of the advantages of Li+ technology and specially that of the PROLINK-4 power supply is the great flexibility it has which allows for quick 2-3 hour charging time from the mains or through car lighter adapter. Alternatively it can also accept slower charging sessions from less powerful sources. The instrument can be operated while batteries are charged simultaneously and user can know what is the evolution of the charging process.

In all environments



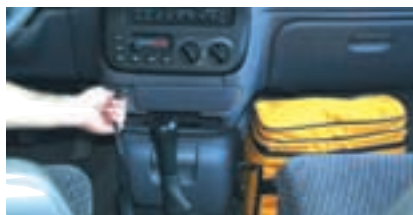
Every detail has been taken into consideration so that PROLINK-4 can be operated in any environment.



The PROLINK-4 is very light and durable. Lightweight metal chassis, special TV monitor fixing brackets, water resistant flat panel and rubber protectors are some of the key factors involved into the hit and drop protection.

Language

Menus in English, Spanish, French, German and Italian are available in the PROLINK-4.



Back-pack type carrying case

The equipment is delivered with a carrying bag that can be used as a backpack, making it easier to climb ladders and other difficult locations.



A viewing hood has been incorporated to the carrying bag itself to improve screen contrast when working against direct sunlight.

