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# BTPRO-7000S

## HD Tablet/Touch Signal Analyzer



*Model:* BTPRO-7000  
*Stock#:* 4231

Rev: 110414



Digital CATV



# BTPRO-7000S Benefits

**Engineers and technicians can easily configure, calibrate, and test various types of analog TV, or radio signals in the lab or out in the field**

- Tablet-size design yields a compact, lightweight, portable test instrument (10"x6"x2")
- 7-inch color, touch-screen user interface.
- Comprehensive signal-parameter measurement and display obviates the need for additional test gear.
- Auto discovery allows for quick, automatic set-up.

## **Measurements:**

- MER, PER, LDPC, BCH, aBER, bBER, EVM, noise margin, level/power, real time spectrum analyzer and constellation display

## **CATV Measurements:**

- INGRESS mode, LEAKAGE mode, BAR SCAN, TILT,
  - and is available with DOCSIS option.





# BTPRO-7000S Features

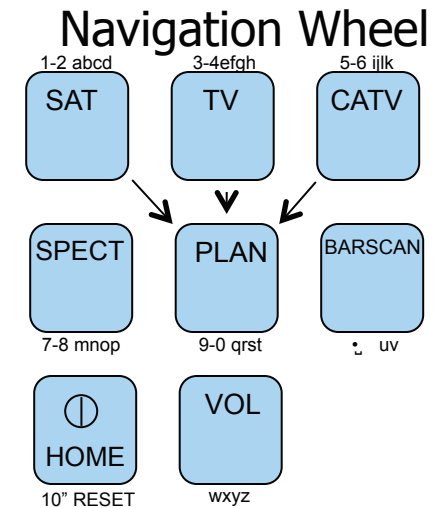
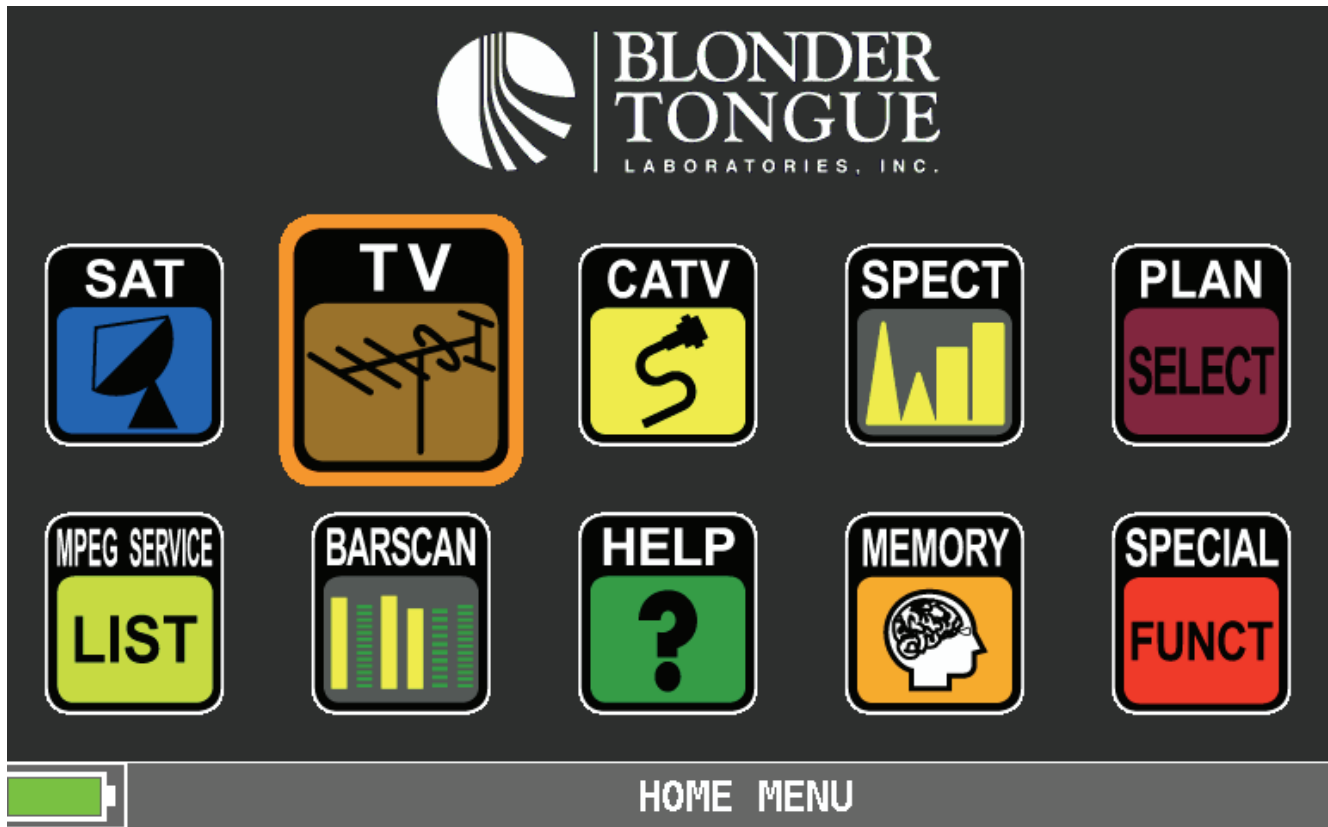
- TV and CATV tuner, extended band, 4-1000 MHz
- Satellite tuner, extended band, 930-2250 MHz (optional)
- Spectrum in real time, fast and super-fast with memory peak
- Detects, measures and displays video of MPEG 2/4 and H.264 HD programs
- All measurements, program lists, A/V PIDs, NET ID, virtual channel number, settings and pictures on one screen
- Automatic quality analysis: FAIL-MARG-PASS
- Auto memory, Manual memory and Datalogger functions
- Help function automatically identifies all the signals with digital modulation SAT, TV and CATV
- Bar scan TV and CATV function from 10 to 100 channels on one screen
- Audio decoding of AAC and AC3
- Battery test function, to regenerate and measure the batteries and calibrate the battery indicator
- Pre-memorized SAT transponder navigation
- Assisted satellite dish pointing



# BTPRO 7000S



- Home Screen
- Allows the user to access any of the units Modes/Functions
  - The user can either touch the screen or use the Navigation Wheel or keypad to switch between screen selections.



# BTPRO 7000S Measurement Screen



- TV Main measurement screen
  - The following information is displayed in both Numerical and Bar graph.
    - Power (Signal strength of channel under test)
    - MER (Modulation error rate)
    - NsMAR (Noise Margin)
    - bBER (Bit Error rate of incoming signal before correction)
    - aBER (Bit Error rate of incoming signal after correction)



- Additional information the appears on the screen is
  - Live video of channel/program under test
  - Program information
    - Virtual (PISP) channel data
    - Network information
    - PID data
    - Symbole Rate
    - Encryption
      - Indicates if Programs are Clear or encrypted.



# BTPRO 7000S Measurement Screen



- Channel selection

- Channels can be accessed in one of two ways

- One way is to high light the channel selection on the main screen and turn the Navigation wheel to change the channels
    - Or hold down the Navigation wheel for 2 seconds and a channel selection dropdown will appear. Simply select the channel and push the Navigation wheel to enter or touch the screen with your finger to select the channel.

PLAN	MODULAT	CONST	DC@RF	FREQ	CHAN
USABRO	VSB	8VSB	OFF	557.00	28

POWER: -2.9dBmV	
-30 -15	0 15 30 45 60
MER: >36dB	
8 12 16 20 24 28 32 36 40	
NsMAR: 15.3dB QLY: PASS	
-1 3 7 11 15 19 23	
bBER: <10-9	
-2 -3 -4 -5 -6 -7 -8	
aBER: <10-9 ERR: 000	
-2 -3 -4 -5 -6 -7 -8	

WNBC		
VPID: 49 APID: 52 PHT: 48		
ANNEX: 8VSB		
SYM. RATE: 5.381MS/s		
ENCRYPT.: Clear		

NTD: 4-1	NETW: WNBC	MENU & ?
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PLAN	MODULAT	CONST	DC@RF	FREQ	CHAN
USABRO	VSB	8VSB	OFF	557.00	28

POWER: -2.9dBmV	
-30 -15	0 15 30 45 60
MER: >36dB	
8 12 16 20 24 28 32 36 40	
NsMAR: 15.3dB QLY: PASS	
-1 3 7 11 15 19 23	
bBER: <10-9	
-2 -3 -4 -5 -6 -7 -8	
aBER: <10-9 ERR: 000	
-2 -3 -4 -5 -6 -7 -8	

23	525.25	MASTER
24	531.25	MASTER
25	537.25	MASTER
26	543.25	MASTER
27	549.25	MASTER
28	555.25	MASTER
29	561.25	MASTER
30	567.25	MASTER
31	573.25	MASTER
32	579.25	MASTER

NID: 4-1	NETW: WNBC	1	2	3	4	5	6	7	8	9	0
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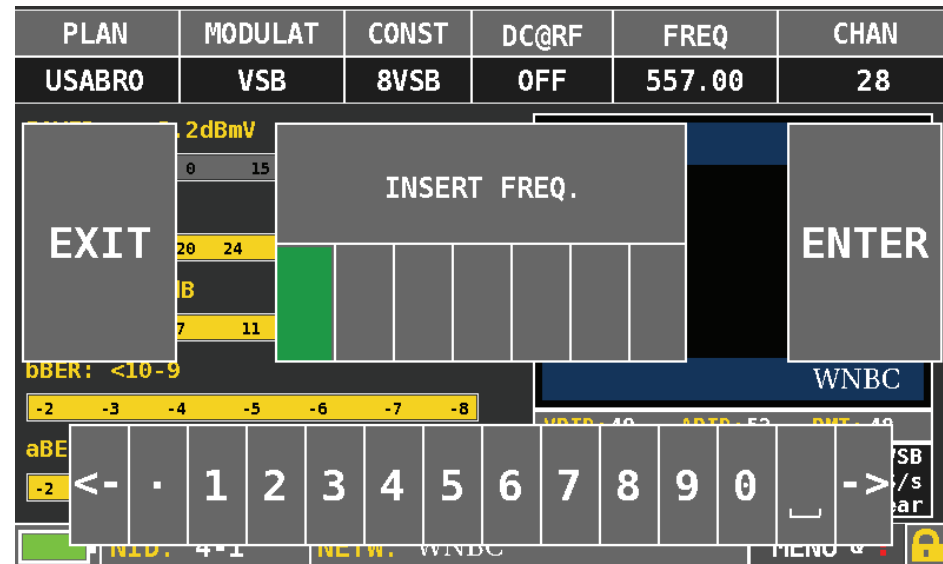
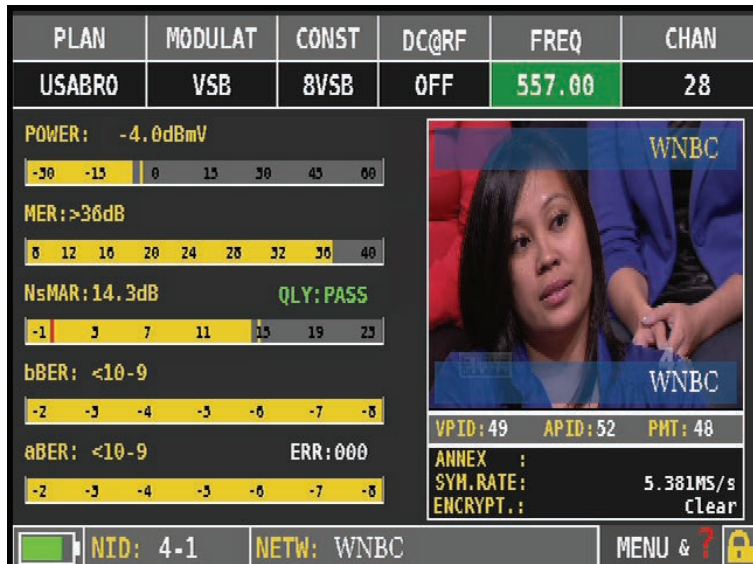






# BTPRO 7000S Measurement Screen

- Frequency selection
  - Channels or carriers can also be accessed by tuning there Frequency, in one of two ways
    - One way is to high light the Frequency and turn the Navigation wheel to change the channels
    - Or hold down the Navigation wheel for 2 seconds and a channel selection dropdown will appear. Simply select the channel and push the Navigation wheel to enter or touch the screen with your finger to select the channel.



# BTPRO 7000S Measurement Screen



- Program/Channel information
  - If the RF channel contains more than one program the program information screen allows the user to select between programs.
    - This mode is accessible by clicking on the channel information box under the Video screen or clicking on the MPEG Service box on the Home page.
  - The following information is displayed on this page
    - List of available programs
    - Video Data rate
    - Service ID
    - Along with other information that was displayed on the main measurement page.

PLAN	MODULAT	CONST	DC@RF	FREQ	CHAN
USABRO	VSB	8VSB	OFF	557.00	28

NAME	TYPE	ENC	LCN
WNBC	TV	N	
COZI-TV	TV	N	

DATE:	28/10/2014
VIDEO RATE:	14.74 Mb/s

VPID: 49	APID: 52	PMT: 48
SERV. ID.:	3	
TELETEXT:	NO	
ENCRYPT.:	Clear	

NID: 4-1	NETW: WNBC	MENU & ?	🔒
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PLAN	MODULAT	CONST	DC@RF	FREQ	CHAN
USABRO	VSB	8VSB	OFF	557.00	28

NAME	TYPE	ENC	LCN
WNBC	TV	N	
COZI-TV	TV	N	

DATE:	28/10/2014
VIDEO RATE:	1.00 Mb/s

VPID: 65	APID: 68	PMT: 64
SERV. ID.:	4	
TELETEXT:	NO	
ENCRYPT.:	Clear	

NTD: 4-2	NETW: COZI-TV	MENU & ?	🔒
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# BTPRO 7000S Measurement Screen



- Full Screen Video Display
- This mode is accessible by clicking on the Video Box in the Main Measurement Screen
  - The following information is displayed on this page
    - Video encoding
    - Resolution
    - Screen size
    - Audio Coding and Language



# BTPRO 7000S Measurement Screen



- Other parameters that can be accessed from the Main Measurement screen are.
  - DC@RF (Allows user to supply a DC voltage at the RF input to the meter)
  - CONST (Allows user to select between different constellation modes if available)
  - Menu (Display extra functions depending on what screen the user is in.

PLAN	MODULAT	CONST	DC@RF	FREQ	CHAN
USABRO	VSB	8VSB	OFF	557.00	28
POWER: -3.6dBmV			5V	WNBC	
MER: 28.9dB			12V		
NsMAR: 7.2dB			18V		
QLY: PASS			24V		
bBER: <10-9			VPID: 49	APID: 52	PMT: 48
aBER: 2x10-9			ANNEX: 8VSB	5.381MS/s	
ERR: 000			ENCRYPT: Clear		
NID: 4-1			NETW: WNBC		MENU & ?

PLAN	MODULAT	CONST	DC@RF	FREQ	CHAN
USABRO	VSB	8VSB	OFF	557.00	28
POWER: -3.3dBmV			8VSB	WNBC	
MER: >36dB					
NsMAR: 15.1dB					
QLY: PASS					
bBER: <10-9			VPID: 49	APID: 52	PMT: 48
aBER: <10-9			ANNEX: 8VSB	5.381MS/s	
ERR: 000			ENCRYPT: Clear		
NID: 4-1			NETW: WNBC		MENU & ?

PLAN	MODULAT	CONST	DC@RF	FREQ	CHAN
USABRO	VSB	8VSB	OFF	557.00	28
POWER: -3.5dBmV			MENU		
MER: >36dB			PRG. NAME: 28		
NsMAR: 15.6dB			LNBLocOsc: 0.0MHz		
QLY: PASS			BUZZER FUNC: OFF		
bBER: <10-9			BUZZ. TYPE: LEVEL		
aBER: <10-9			VISUALIZE NIT		
ERR: 000			CHANNEL LOGGER		
EXIT			HELP ?		
TSID: 2159			NETW: WNBC		MENU & ?

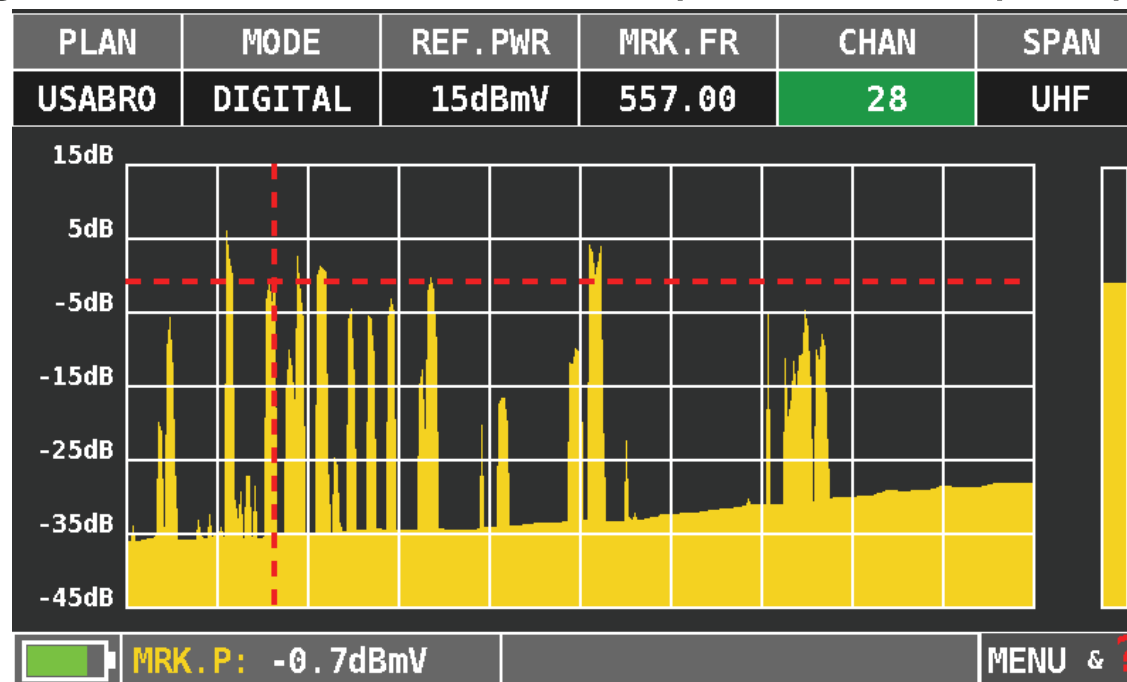
PLAN	MODULAT	CONST	DC@RF	FREQ	CHAN
USACAB	J83-B	QAM256	OFF	441.00	60
POWER: -5.2dBmV			QAM64	SDE-4AV	
MER: >40dB			QAM256		
NsMAR: 16.4dB					
QLY: PASS					
bBER: <10-9			VPID: 101	APID: 102	PMT: 100
aBER: 2x10-9			ANNEX: J83-B	5.361MS/s	
ERR: 000			ENCRYPT: Clear		
NID: 600-1			NETW: SDE-4AV		MENU & ?



# BTPRO 7000S Spectrum Screen



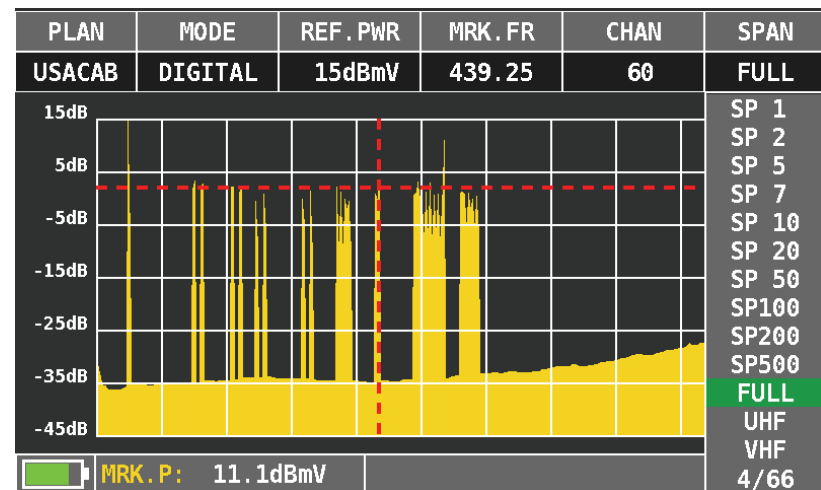
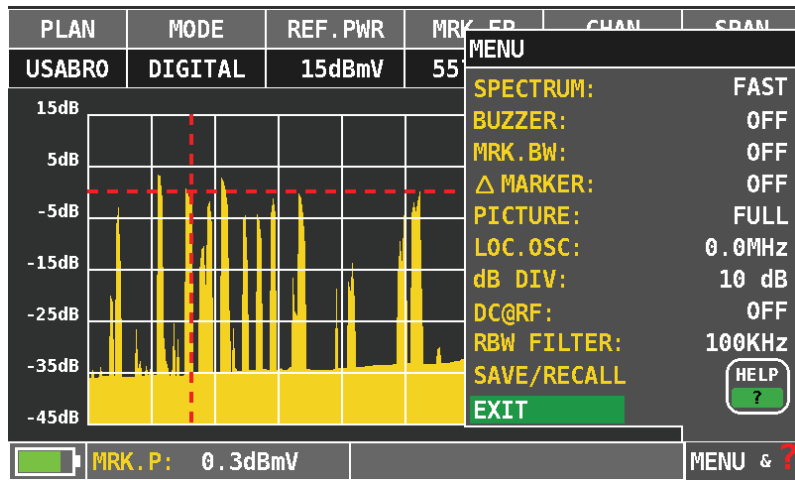
- Spectrum mode can be accessed by pressing the spectrum button on the front of the unit or navigating to the Home screen and highlighting the spectrum button there. .
  - The spectrum display shows the following information.
    - Level
    - Marker for both frequency and level
    - Adjustable spectrum width
  - Tuning of the marker can be done by channel or by frequency



# BTPRO 7000S Spectrum Screen



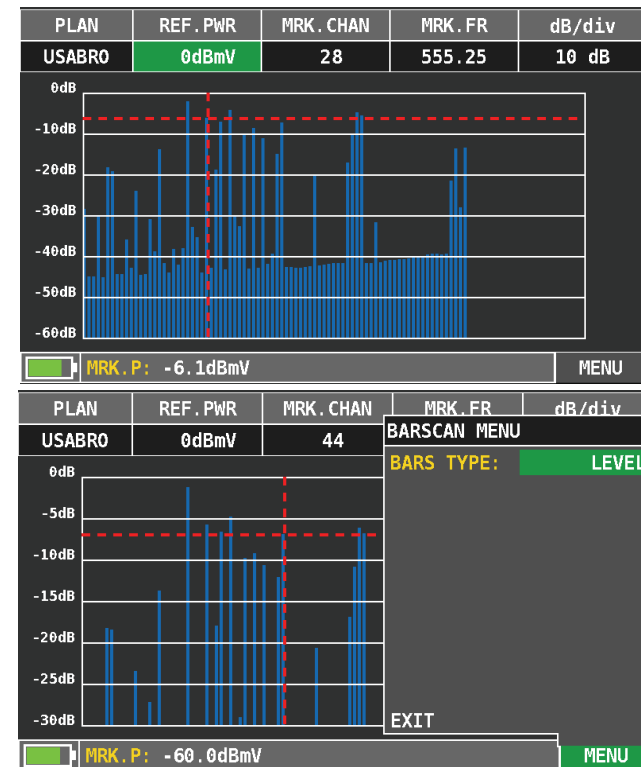
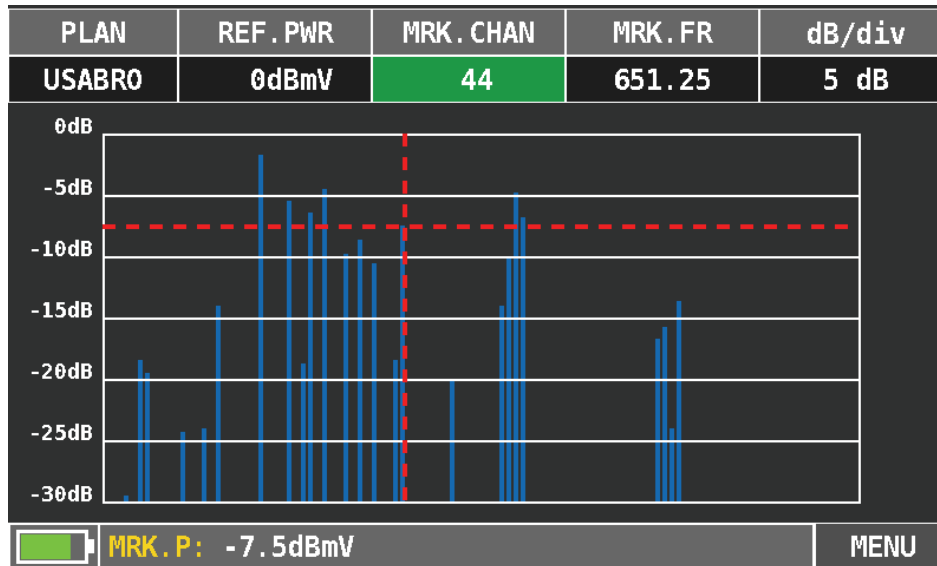
- Other setting/screens that are available while in the spectrum mode are
  - The Help Menu
    - Allows the user to change functions or viewing of the spectrum screen.
    - The help in the Help Menu will also look at a single channel and identify the correct unit parameters if different then what is being used.
  - The SPAN selection allows the user to change the screen span
  - Menu (Display extra functions depending on what screen the user is in.



# BTPRO 7000S Barscane Screen



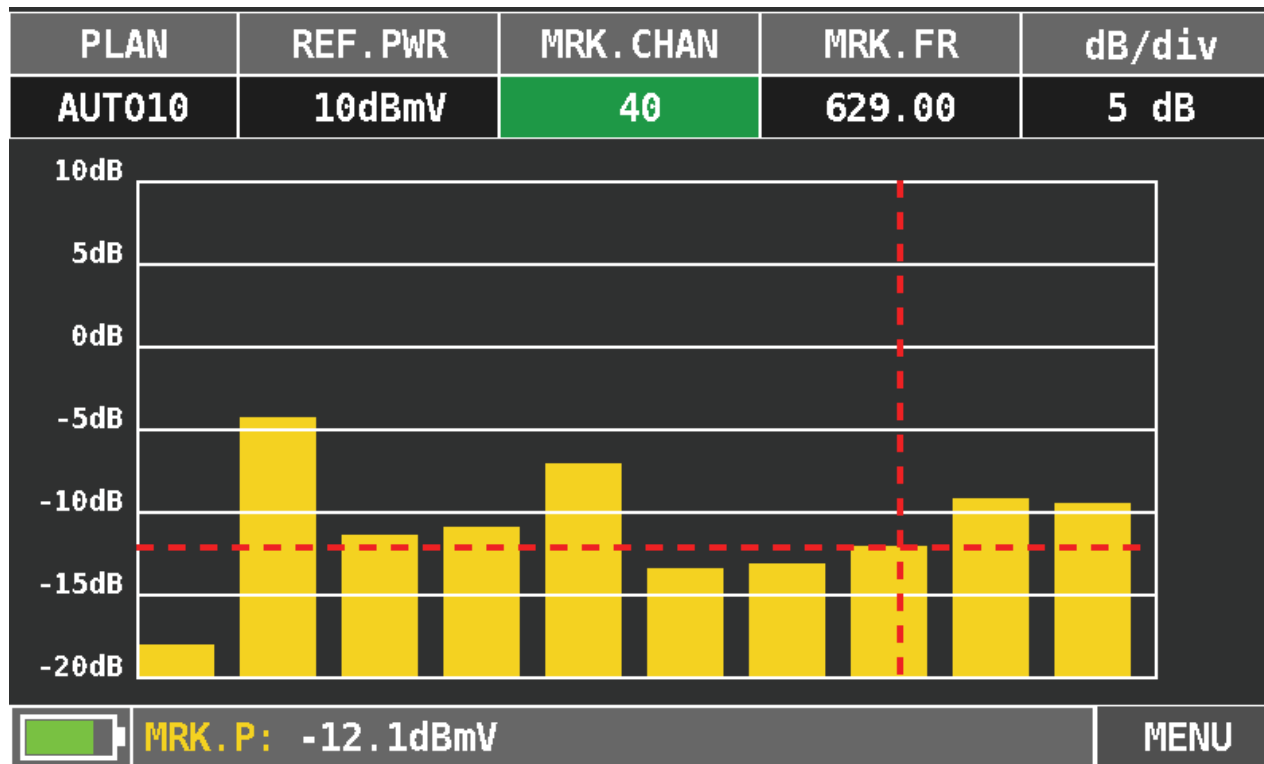
- The BarScan mode displays the carriers or RF channel as a single digital bar.
- Gives digital representation of both the Digital QAM and Analog carriers.
  - Allows the user to change functions or viewing of the screen.
  - The Help Menu is also available as well as some of the same functions that were available in the spectrum screen.



# BTPRO 7000S Barscane Screen



- Example of a Bar Scan graph on a custom channel plan with limited carriers..
- Only the channels in the custom plans memory are displayed



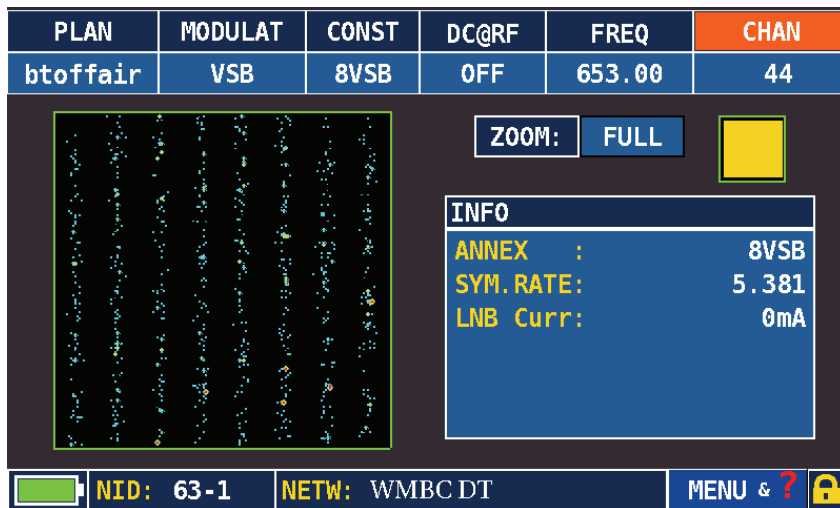


# BTPRO-7000S Constellation Screens

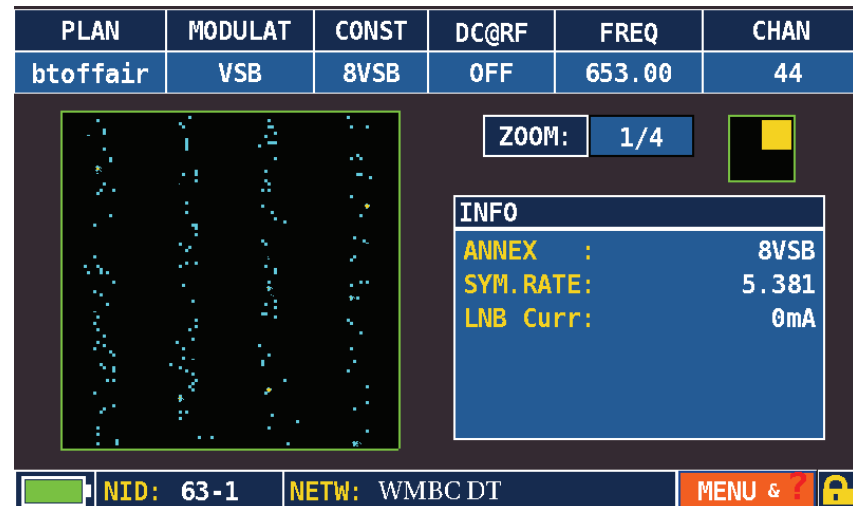


- The constellation screen can be accessed by pressing the TV button when in the measurement screen
  - The constellation below is for and 8 VSB signal
  - The constellation can be looked as a full constellation or as quarters to get a better view of the individual symbol blocks .

## Constellation: Full



## Constellation: Zoom

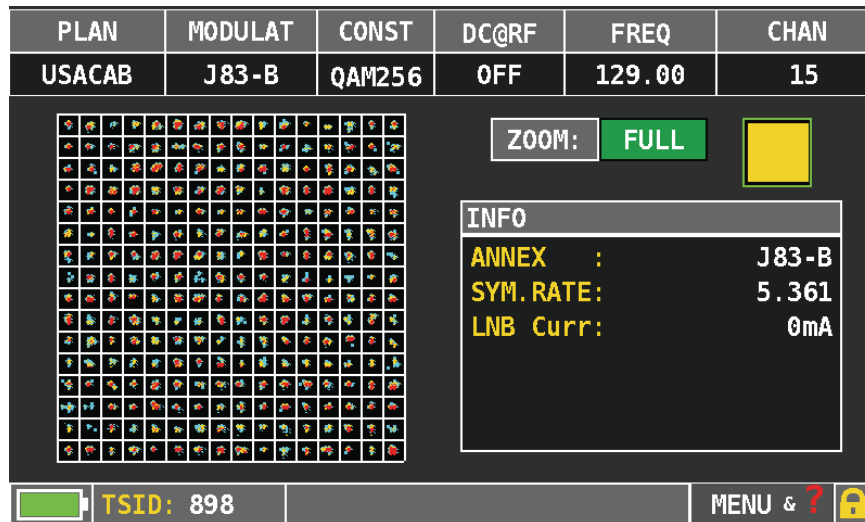


# BTPRO-7000S Constellation Screens

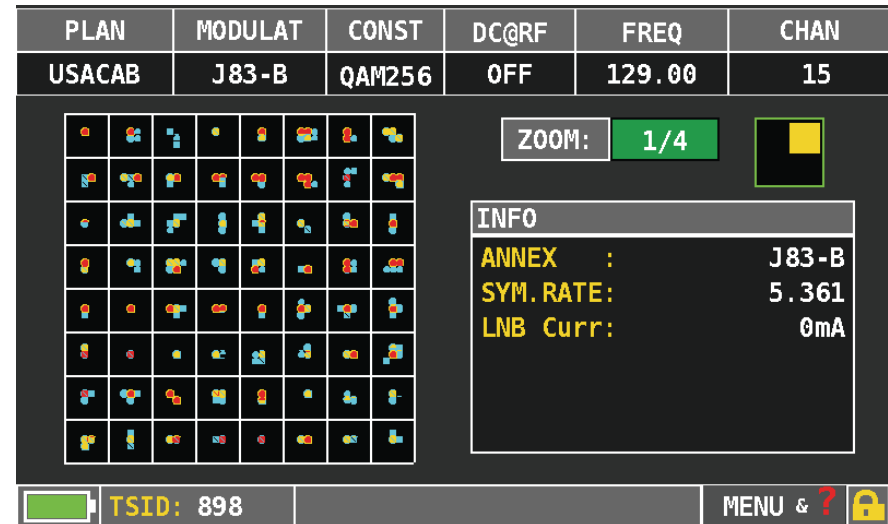


- The constellation screen can be accessed by pressing the CATV button when in the measurement screen
  - The constellation below is for and Clear QAM 256 signal
  - The constellation can be looked as a full constellation or as quarters to get a better view of the individual symbol blocks .

## Constellation: Full



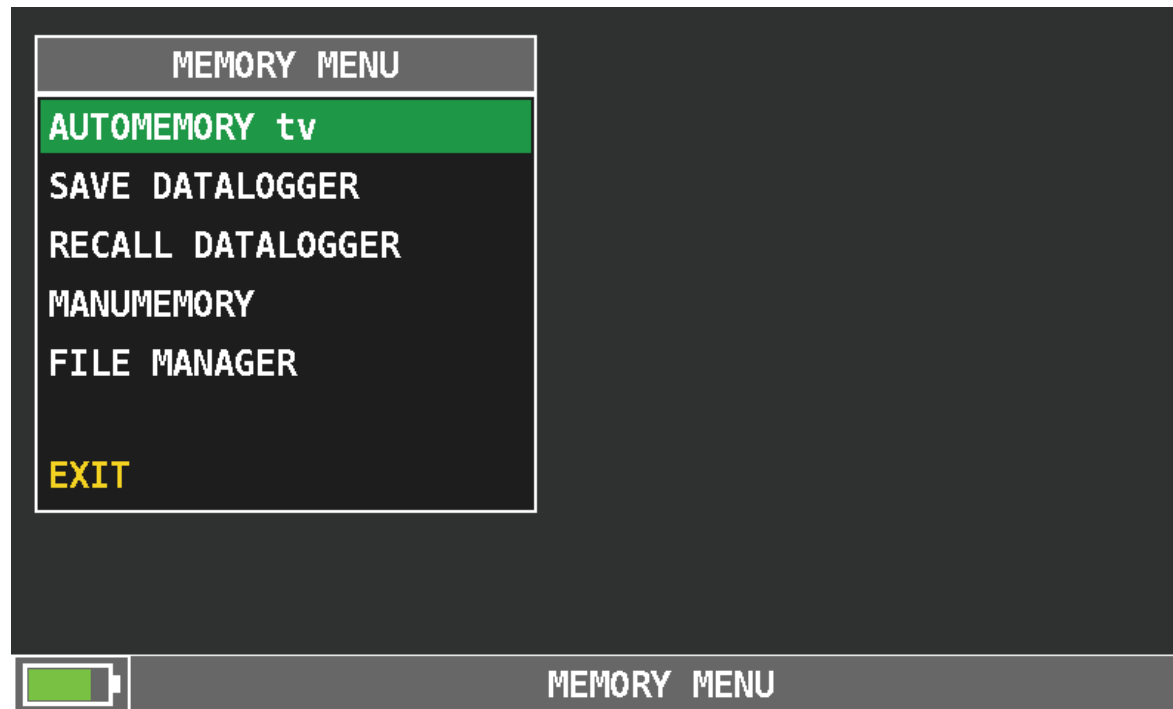
## Constellation: Zoom





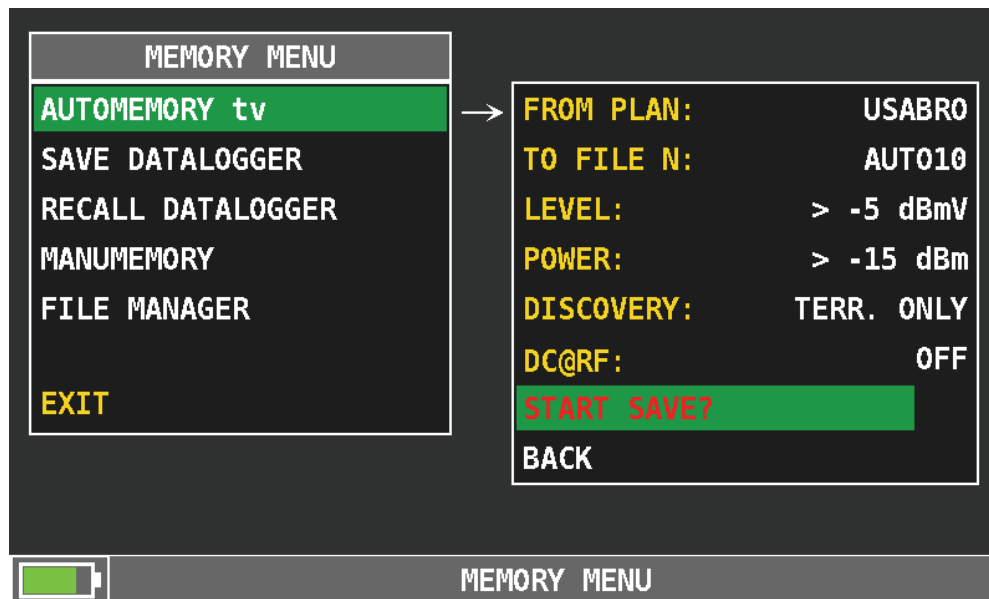
# BTPRO-7000S Memory

- The Memory function of the unit can be accessed from the Home screen
  - The Memory screen allows the user to:
    - Build his own unique channel line based on the system under test.
      - By auto memory mode or by manual mode
    - Save the readings associated with the system the user is working on.
    - Manage the stored flog files

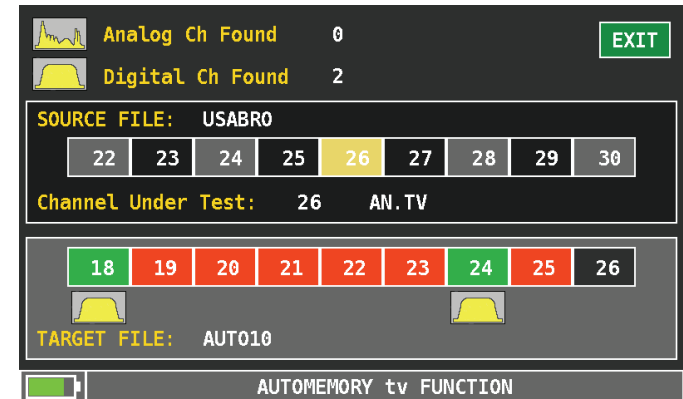


# BTPRO-7000S Memory

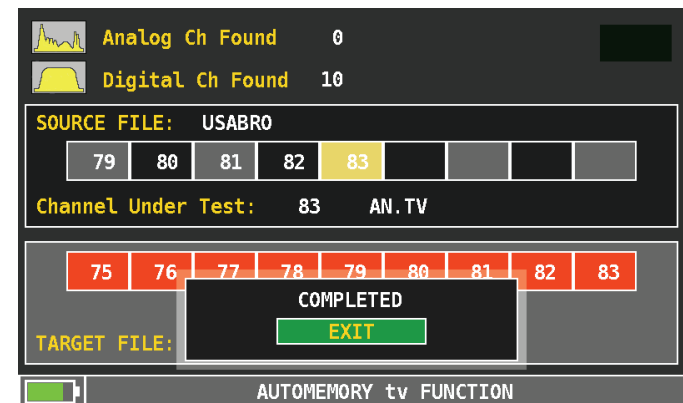
- Auto memory scan of existing off-air UHF feed
  - Select AUTOMEMORY tv. Set PLAN, LEVEL, POWER, DISCOVERY and start the scan.



## Scan in progress

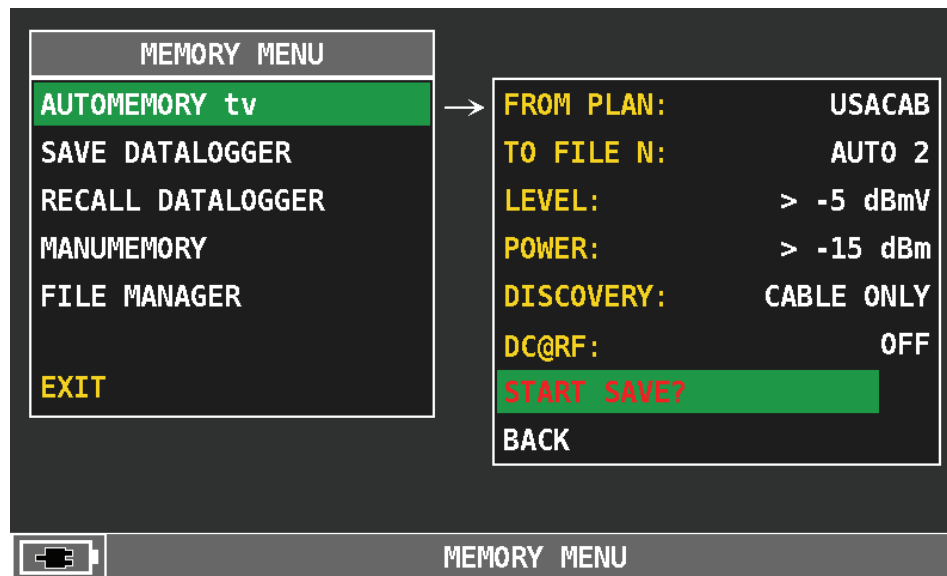


## Finished Scan

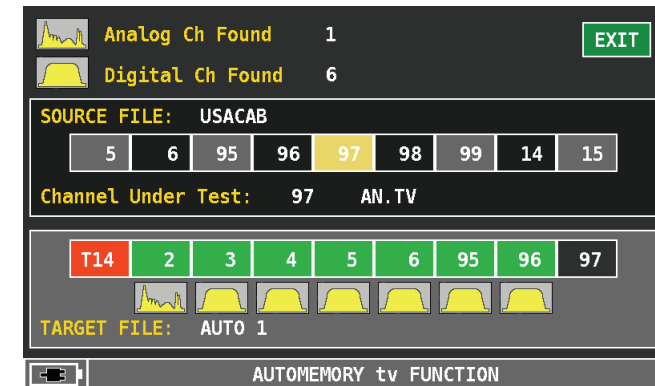


# BTPRO-7000S Memory

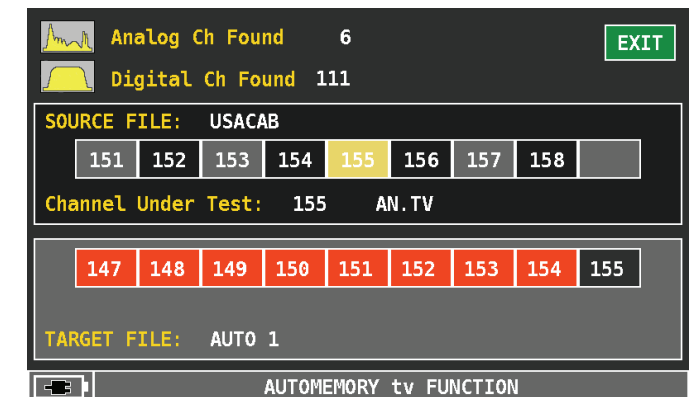
- Auto memory scan of Cable feed
  - Select AUTOMEMORY tv. Set PLAN, LEVEL, POWER, DISCOVERY and start the scan.



## Scan in progress



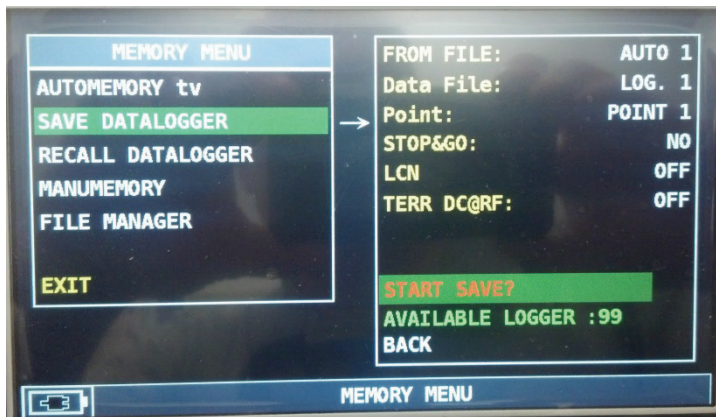
## Finished Scan



# BTPRO-7000S Datalogger



- The Datalogger function is accessible from the Memory screen
  - Select the Datalogger function and set the parameters
    - Source file (channel plan) that should be used for the scan.
    - Location of data file
    - Start the scan
  - The Data logger will go through all the channels in the selected channel plan one by one and log the readings into memory.





# BTPRO-7000S Memory



- As Datalogger steps through each channel it
  - Displays them as analog or digital
  - Highlights the total test report as a pass/fail
  - Logs the following information into a downloadable log file
    - Signal type
    - Power level
    - MER if digital
    - dBER if digital
    - aBER if digital
    - C/N if analog
    - A/V ratio if analog



LOG. 1 POINT 1		EXIT			
NAME	TYPE	PWR LVL	MER C/N	bBER A/V	aBER PER
2	An TV	12.4	44.7	13.8	
3	J83B	10.7	>40	2.0E-07	<E-09
4	J83B	10.9	>40	<E-09	<E-09
5	J83B	10.7	>40	<E-09	<E-09
6	J83B	9.3	>40	<E-09	<E-09
95	J83B	9.6	>40	<E-09	<E-09
96	J83B	9.0	>40	<E-09	<E-09
97	J83B	8.2	>40	<E-09	<E-09
98	J83B	8.8	>40	<E-09	<E-09
99	J83B	8.7	>40	<E-09	<E-09
14	J83B	8.6	>40	<E-09	<E-09

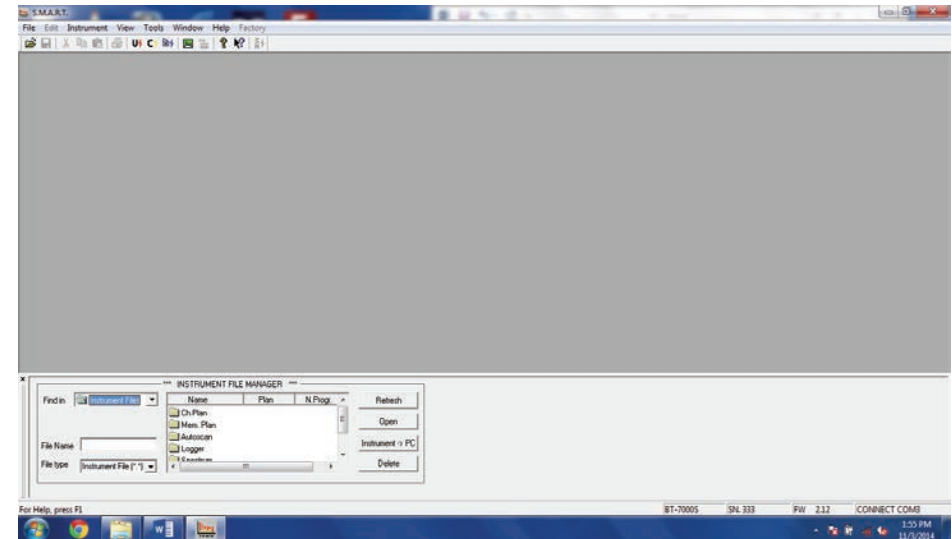
RECALL DATALOGGER





# BTPRO-7000S S.M.A.R.T Program

- The S.M.A.R.T. program allows the user access to all internal files
  - Channel Plan
  - Memory plans
  - Auto Scan plans
  - Logger Files
  - Spectrum Files
  - Threshold Files
- Channel Plan files contain all the channels plans in the unit
  - Example
    - USABRO – USE Off-Air UHF/VHF channel frequency assignments
    - USACAB - USE standard cable frequency assignments
    - USAHRC - USE HRC (Harmonically related Carrier) cable frequency assignments
    - USAIRC - USE IRC (Incrementally related Carrier) cable frequency assignments
    - Plus Russian, Australian, Polish, and others.



# BTPRO-7000S S.M.A.R.T Program



- The Datalogger files, store the following information about the system, the scan was ran on.
  - Logs the following information into a downloadable log file
    - Signal type (Analog or Digital and what Digital format)
    - Power level (analog and Digital channels)
    - MER if digital
    - dBER if digital (Pre Bit error)
    - aBER if digital (Post Bit error - after correction)
    - C/N if analog
    - A/V ratio if analog

The screenshot displays the S.M.A.R.T. software interface. The main window shows a table of scan results with columns for Program, Mode, Channel, Frequency, Program Name, Symbol Rate, AU-FR, CAR, Stand., Level, Power, C/N, MER, V/A, bBER, aBER, PER, N.M.A., and Q.LTY. Below the table is an 'INSTRUMENT FILE MANAGER' window showing a list of files for 'POINT 1'.

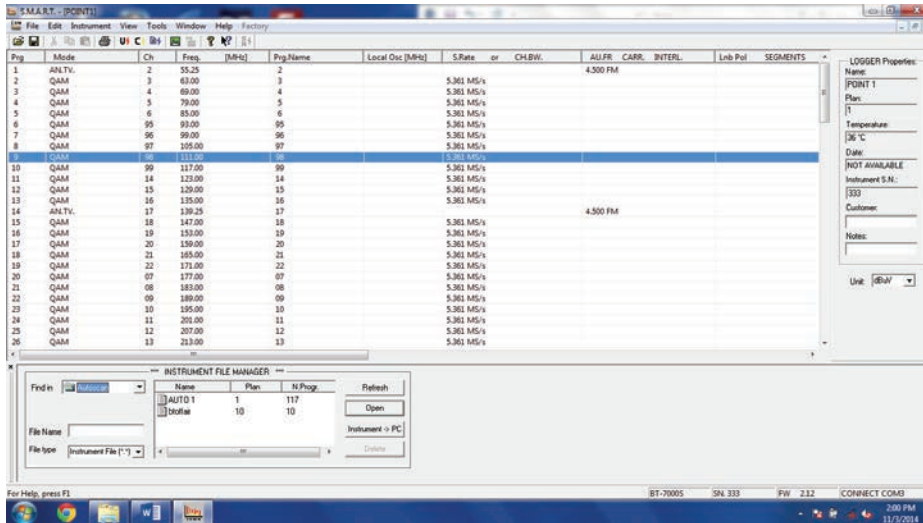
Prg	Mode	Ch	Freq.	Prg_Name	S.Rate	AU-FR	CAR	Stand.	or	Level	or	Power	C/N	MER	V/A	bBER	aBER	PER	N.M.A.	Q.LTY
1	AN.TV.	2	55.25	2	...	4.500	FM	...		72.4dBuV		44.7dB			13.8dB					PASS
2	QAM	3	63.00	3	5.361 MS/s			QAM256		70.7dBuV		>40dB				2x...	2x10-9	>12 dB		PASS
3	QAM	4	69.00	4	5.361 MS/s			QAM256		70.9dBuV		>40dB				<...	2x10-9	>12 dB		PASS
4	QAM	5	79.00	5	5.361 MS/s			QAM256		70.7dBuV		>40dB				<...	2x10-9	>12 dB		PASS
5	QAM	6	85.00	6	5.361 MS/s			QAM256		69.3dBuV		>40dB				<...	2x10-9	>12 dB		PASS
6	QAM	95	93.00	95	5.361 MS/s			QAM256		69.6dBuV		>40dB				<...	2x10-9	>12 dB		PASS
7	QAM	96	99.00	96	5.361 MS/s			QAM256		69.0dBuV		>40dB				<...	2x10-9	>12 dB		PASS
8	QAM	97	105.00	97	5.361 MS/s			QAM256		68.2dBuV		>40dB				<...	2x10-9	>12 dB		PASS
9	QAM	98	111.00	98	5.361 MS/s			QAM256		68.8dBuV		>40dB				<...	2x10-9	>12 dB		PASS
10	QAM	99	117.00	99	5.361 MS/s			QAM256		68.7dBuV		>40dB				<...	2x10-9	>12 dB		PASS
11	QAM	14	123.00	14	5.361 MS/s			QAM256		68.6dBuV		>40dB				<...	2x10-9	>12 dB		PASS
12	QAM	15	129.00	15	5.361 MS/s			QAM256		67.9dBuV		>40dB				<...	2x10-9	>12 dB		PASS
13	QAM	16	135.00	16	5.361 MS/s			QAM256		68.4dBuV		>40dB				<...	2x10-9	>12 dB		PASS
14	AN.TV.	17	139.25	17	...	4.500	FM	...		69.7dBuV		44.3dB			12.7dB					PASS
15	QAM	18	147.00	18	5.361 MS/s			QAM256		68.5dBuV		>40dB				<...	2x10-9	>12 dB		PASS
16	QAM	19	153.00	19	5.361 MS/s			QAM256		68.8dBuV		>40dB				<...	2x10-9	>12 dB		PASS
17	QAM	20	159.00	20	5.361 MS/s			QAM256		69.6dBuV		>40dB				<...	2x10-9	>12 dB		PASS
18	QAM	21	165.00	21	5.361 MS/s			QAM256		68.5dBuV		>40dB				<...	2x10-9	>12 dB		PASS
19	QAM	22	171.00	22	5.361 MS/s			QAM256		68.5dBuV		>40dB				<...	2x10-9	>12 dB		PASS
20	QAM	07	177.00	07	5.361 MS/s			QAM256		69.0dBuV		>40dB				<...	2x10-9	>12 dB		PASS
21	QAM	08	183.00	08	5.361 MS/s			QAM256		68.4dBuV		>40dB				<...	2x10-9	>12 dB		PASS
22	QAM	09	189.00	09	5.361 MS/s			QAM256		68.2dBuV		>40dB				<...	2x10-9	>12 dB		PASS
23	QAM	10	195.00	10	5.361 MS/s			QAM256		68.1dBuV		>40dB				<...	2x10-9	>12 dB		PASS
24	QAM	11	201.00	11	5.361 MS/s			QAM256		67.6dBuV		>40dB				<...	2x10-9	>12 dB		PASS
25	QAM	12	207.00	12	5.361 MS/s			QAM256		67.6dBuV		>40dB				<...	2x10-9	>12 dB		PASS
26	QAM	13	213.00	13	5.361 MS/s			QAM256		68.8dBuV		>40dB				<...	2x10-9	>12 dB		PASS
27	QAM	23	219.00	23	5.361 MS/s			QAM256		67.3dBuV		>40dB				<...	2x10-9	>12 dB		PASS
28	QAM	24	225.00	24	5.361 MS/s			QAM256		67.5dBuV		>40dB				<...	2x10-9	>12 dB		PASS



# BTPRO-7000S S.M.A.R.T Program



- Auto Scan plans capture in the units Memory.



- Cable line-up

- Off-Air Antenna Feed

