

DS2600C

Digital TV QAM Analyzer

Key Benefits

- High Speed Spectrum Analysis: 4~1220MHz (option for 4~2150MHz)
- Spectrum Persistence Analysis: any frequency band, max span 206MHz
- Integrated DOCSIS 3.0 Cable Modem
- Integrated Upstream Signal Generator (no FEC)
- Support ITU-T J.83 Annex A/B/C
- Error Vector Spectrum: identifies interference signals under QAM carriers, with no break in service
- Gated Measurement: In-service measurement C/N, CSO, CTB
- Auto Test
- Asset and Test-data Management Software
- WiFi Analysis



It's the CATV field engineer's best tool. Integrating multiple functions in a single handheld instrument, the new DS2600C is a powerful Digital TV QAM Analyzer with a comprehensive measurement suite specifically designed for HFC network testing, troubleshooting and maintenance.

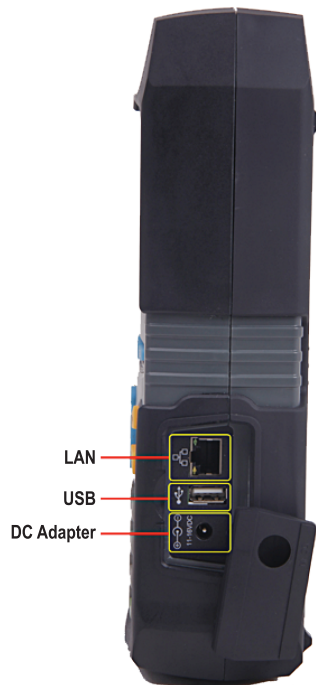
The DS2600C's main functions include Enhanced Spectrum Analysis, Analog & Digital TV Analysis, DOCSIS 3.0 Analysis, Upstream Signal Generator, Simple Ethernet testing, WiFi testing, and Auto Test. DS2600C's lightweight, rugged hardware offers outstanding performance, and the instrument improves on previous models with new features to support in-service measurements and interference checks.

With the new Upstream Spectrum Analysis, users can perform persistence measurements (any frequency band, max span 206MHz) to locate interference signals that traditional spectrum analyzers fail to capture.

For analog TV, the DS2600C's Gated measurement function enables non-linear channel testing for C/N, CSO, and CTB signals. Hunt down signal interference with a powerful array of analysis modes: EVS for CMTS downstream signal and DVB-C signal, persistence analysis for Cable Modem upstream signal, and more - while remaining in-service. The DS2600C supports Deviser's PC software toolkit for small-scale applications, and the Asset & Test-date Management system SYNCOR for large-scale applications.



FSK Communication
RF Input USG Output



High-Speed Spectrum Analysis

The DS2600C offers enhanced spectrum analysis performance with a frequency range of 4MHz ~ 1220MHz, (upgradeable to 2150MHz), and sensitivity to signals as low as -50dBmV (@300kHz).

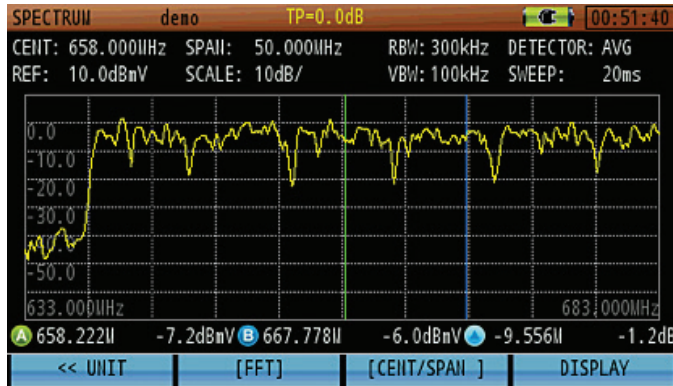


Figure 1: Spectrum Analysis

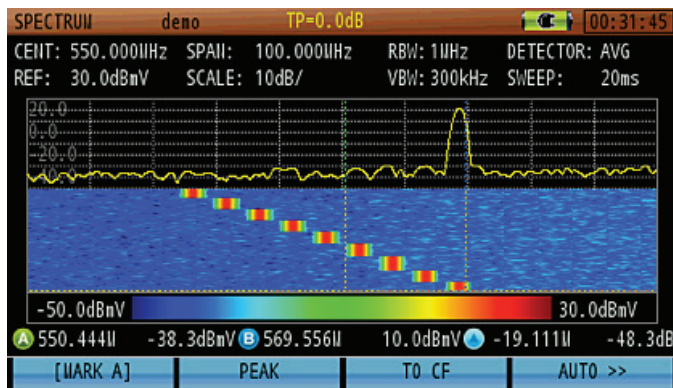


Figure 2: Spectrogram

The spectrogram provides a scrolling three-dimensional display, allowing users to track frequency and level over time - excellent for analyzing intermittent signals.

Spectrum Persistence Technology

New on the DS2600C, Persistence Analysis mode enables in-service detection of transient noise and impairments hiding beneath the upstream signal. Traditionally, troubleshooting the upstream channels requires finding a free upstream spectrum. But with the introduction of DOCSIS 3.0, the upstream channel is now extremely crowded, making it difficult to distinguish the upstream signal from the interference signal. The Persistence Analysis mode makes it easier to find impairments such as CPD and impulse noise with a color-coded spectrum display.

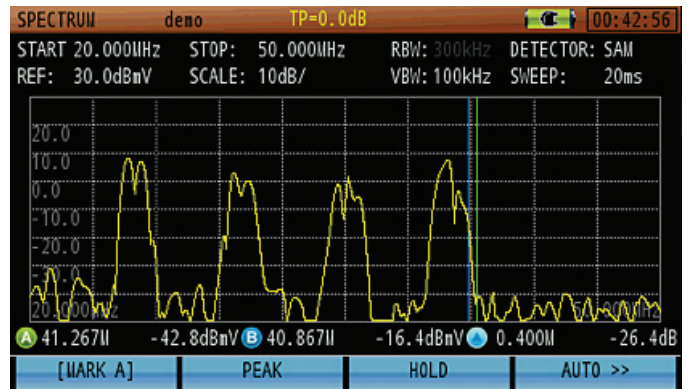


Figure 3: Spectrum Analysis: Low Level Signal Covered by High Level Signal

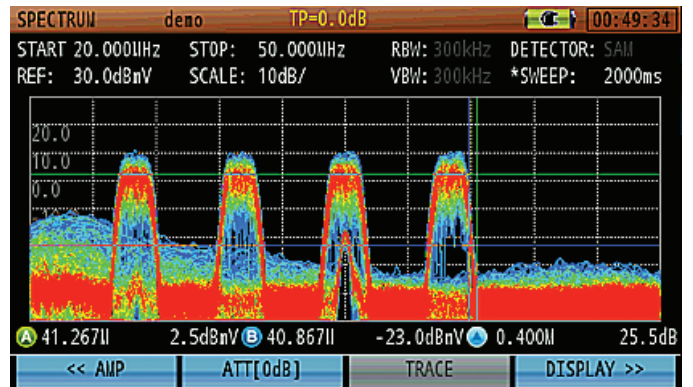


Figure 4: Persistence Shows Ingress Signal Under DOCSIS Upstream Signal

Analog TV Gated Measurement

The Gated measurement function has been added to the DS2600C's analog TV test. This function helps field engineers conduct in-service C/N, CSO, & CTB measurements.

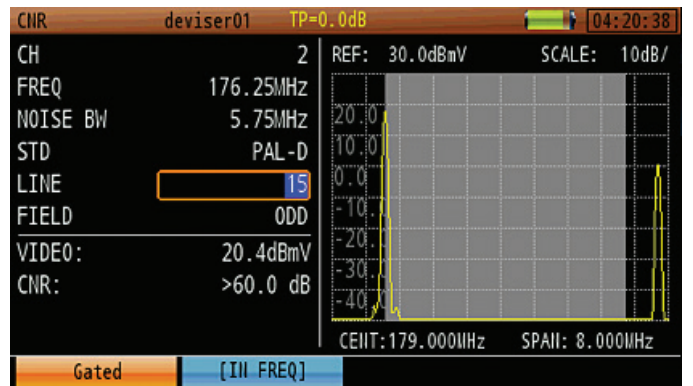


Figure 5: Analog TV Gated Measurement

DVB-C Signal Analysis

The DS2600C supports the ITU-T J.83 Annex A/B/C standard, providing power level, MER, BER, Constellation, and Digital HUM measurements.

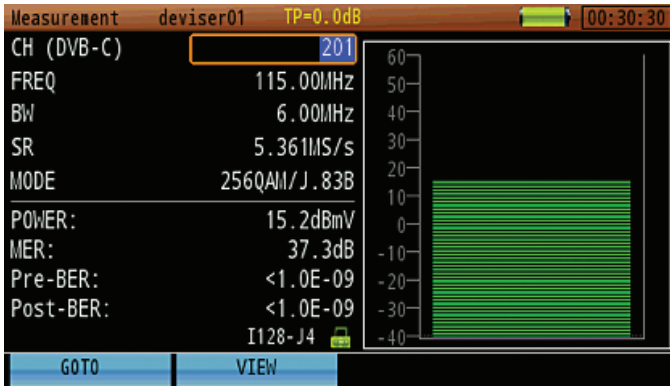


Figure 6: DVB-C Channel Measurement

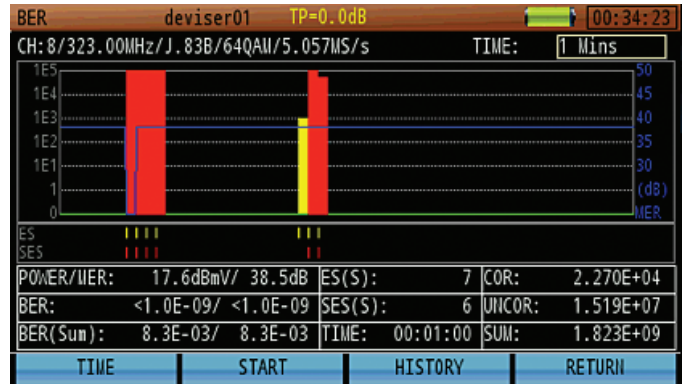


Figure 9: BER and MER Statistical Analysis

The DS2600C also offers Digital HUM distortion measurements, from the fundamental frequency to 4th harmonic components.

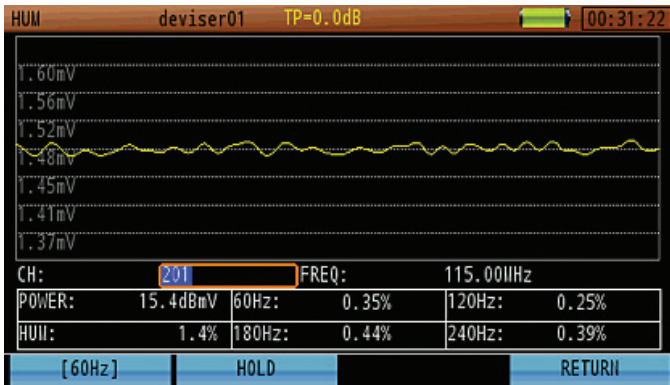


Figure 7: Digital HUM

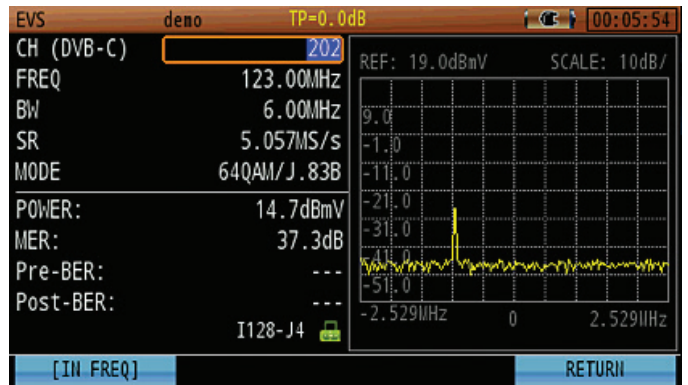


Figure 10: EVS locating narrow-band interference signals

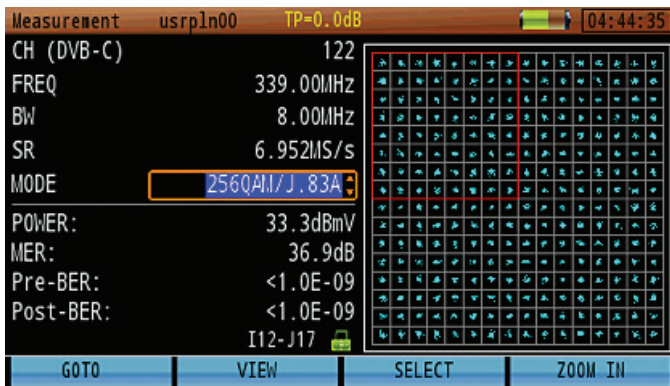


Figure 8: Constellation Display

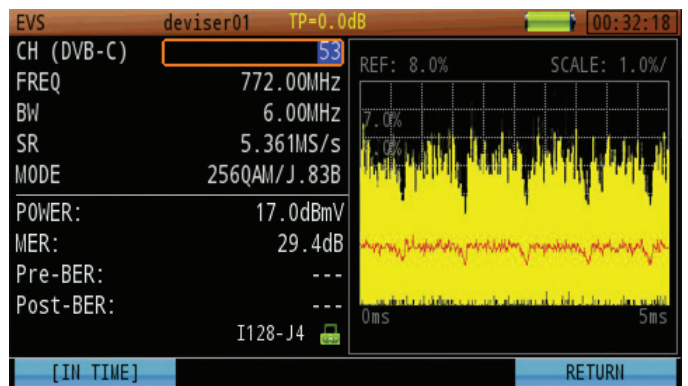


Figure 11: EVS locating broadband LTE interference

Cable Modem Measurement

The DS2600C incorporates a standard DOCSIS 3.0 cable modem, compatible with DOCSIS 1.X, 2.0 & 3.0. The built-in modem supports 8x DS and 4x US bonded carriers. Figure 12 (below) shows the CM statistical info screen - including downstream signal level, modulation type, bandwidth, symbol rate, MER, BER, upstream signal level, modulation type, bandwidth, symbol rate, & UCD (Upstream Channel Descriptor). Users can select the desired DOCSIS mode, downstream channel, and UCD. Basic network test tools include Ping, Traceroute, PPPoE, FTP, and Browser.

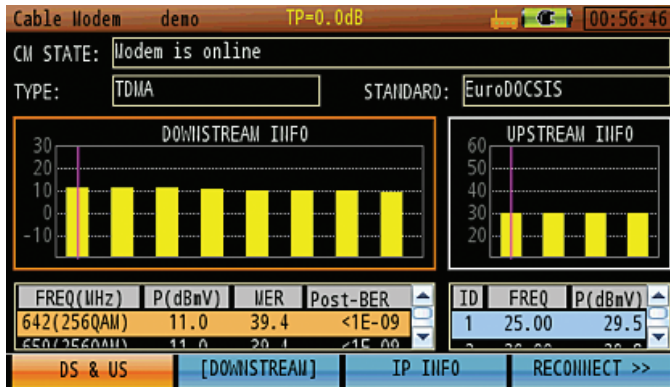


Figure 12: DOCSIS 3.0 Statistical Information Display

Upstream Signal Generator

The Upstream signal generator can generate a CW carrier or a QAM signal. A sweeping mode is also available.

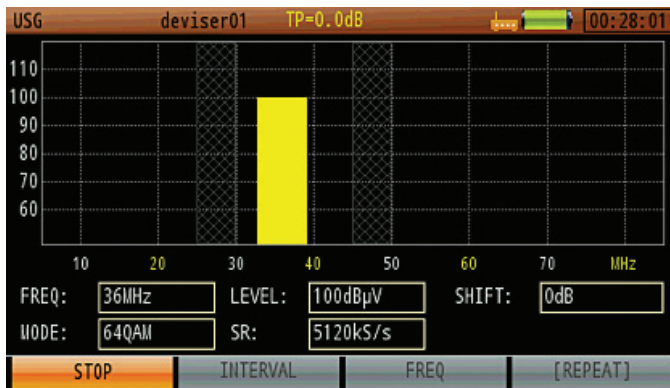


Figure 13: Upstream Signal Generator

WiFi Analysis

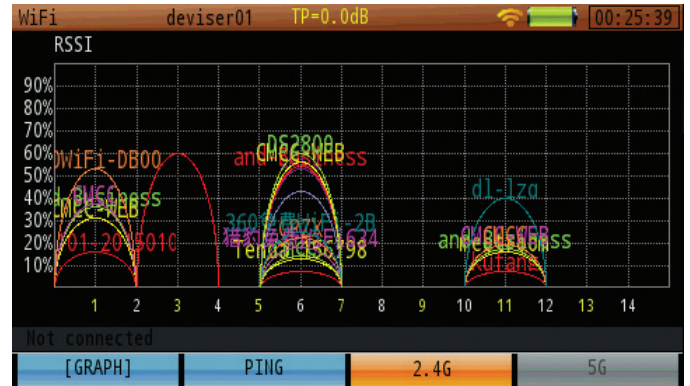


Figure 14: WiFi Analysis

Auto Test

The DS2600C comes equipped with a wide range of region-standard channel plans spanning (in part) North America, Asia, and Europe, as well as several sets of limit profiles - allowing users to design automatic tests. Tasks that can be automated include Analog TV, Digital TV and Cable Modem testing. Once the analyzer completes an auto test, all items in the test results will indicate Pass or Fail according to the limit profile. Results are automatically saved for later analysis.



Figure 15: Auto Test Project

Asset and Test-Data Management Software

Deviser is proud to launch the asset and test-data management software SYNCOR with the DS2600C. This PC-based toolkit can significantly enhance your test and analysis efficiency: generating and editing channel plans, transmitting work orders, receiving and managing test results from multiple devices, and more.

Specifications

Downstream Spectrum Analysis	
Frequency Range	4 MHz ~ 1220 MHz; 1220 MHz ~ 2150 MHz optional
Frequency Stability	± 1 PPM (0°C ~50°C)
Frequency Span	0 MHz ~ Full span
Frequency Step	1 kHz
Resolution Bandwidth filters (-3dB)	30kHz, 100kHz, 300kHz, 1 MHz, 3 MHz
Video Bandwidth filters	30 Hz, 100 Hz, 300 Hz, 1kHz, 3 Hz, 10kHz, 30kHz, 100kHz, 300kHz, 1 MHz, 3 MHz
Display Scale and Range	1, 2, 5, 10, 20 dB/Div; 8 vertical divisions
Sweep Time	20ms ~ 25s
Input Level Range	-60dBmV ~ +60dBmV
Dynamic Range	65dB (300kHz RBW)
Sensitivity	-50dBmV (300kHz RBW, Pre-amplifier On)
Attenuation	0~40dB in 1dB steps
Pre-amplifier	Manual, 18dB Gain
Accuracy of Measurements	<±1.0dB @+25±5°C (typical value)
Measurement Detector	Positive Peak, Negative Peak, Sample, Average, RMS
Reference Level	-80dBmV ~ +70dBmV
Markers	2 vertical markers
Upstream Spectrum Analysis	
Frequency Range	4~46MHz (DOCSIS); 4~68MHz (Euro DOCSIS 2.0); 4~88MHz (Euro DOCSIS 3.0); 4~120MHz (DOCSIS 3.1); 4~210MHz (DOCSIS 3.1);
Frequency Span	42/64/84/116/206 MHz, zero span or manual selections (max 206 MHz)
RBW	100kHz, 300kHz
VBW	30 Hz, 100 Hz, 300 Hz, 1kHz, 3kHz, 10kHz, 30kHz, 100kHz, 300kHz, 1 MHz, 3 MHz
Display Scale and Range	1, 2, 5, 10, 20 dB/Div
Sweep Time	20ms ~ 25s
Input Level Range	-60dBmV ~ +60dBmV
Attenuation	Automatic, 0~40dB
Pre-amplifier	Manual, 18dB Gain
Accuracy of Measurements	<±1.0dB @+25±5°C (typical value)
Measurement Detector	Positive Peak, Negative Peak, Sample, Average
Markers	2 vertical markers
Persistence	
0-7MHz	100%POI minimum signal duration 2.5ms
4-46MHz	100%POI minimum signal duration 4.5ms
4-68MHz	100%POI minimum signal duration 4.64ms
4-88MHz	100%POI minimum signal duration 5.3ms
4-120MHz	100%POI minimum signal duration 6.3ms
4-210MHz	100%POI minimum signal duration 10.6ms

Specifications (continued)

Analog TV Measurement	
Standards	B/G, I, D/K, L/L', M/N
Color Standards	NTSC, PAL, SECAM
Level Measurement Range	40dBmV
Level Measurement Range	-40dBmV ~ +60dBmV
Accuracy	<±1.0dB @+25 ±5°C (S/N >30dB)
Level Resolution	0.1dB
Resolution Bandwidth	300 kHz
CCN	>51dB (Requires +10 dBmV carrier level)
CTB/CSO	≥61dB with ±2.0dB Accuracy
HUM Measurement	1 ~ 20%: ±0.5% (1~5%); ±1.0% (5~20%)
Tilt	Up to 16 channels
Pre-amplifier	Automatic, 18dB Gain
Attenuator	Automatic, 40dB
Digital TV Measurement	
Frequency Range	46 ~ 1050MHz
Power Level Range	-30dBmV ~ +50dBmV
Level Resolution	0.1dB
Accuracy	< ±1.5dB@+25 ±5°C (C/N>20dB)
Modulation Type	16, 32, 64, 128, 256 QAM (J.83 Annex A and C); 64, 256 QAM (J.83 Annex B)
Interleave Depth	(128, 1) ~ (128, 4) for J.83B; (12, 17) for J.83 A/C
Symbol Rate	4.0MS/s ~ 7.0MS/s
SNR	>43dB; Accuracy: ±2.0dB
MER	>41dB; Accuracy: ±2.0dB
BER	1E-3 ~ 1E-9
Constellation	16, 32, 64, 128, 256 QAM
Cable Modem Measurement	
Supported Standards	DOCSIS 1.1, 2.0, 3.0; EuroDOCSIS 1.0, 1.1, 2.0, 3.0
Downstream Demodulation	64, 256QAM
Downstream Frequency Range	>91MHz (US); >100MHz (EU)
Downstream Maximum Speed	Up to 304Mbps (6MHz); And 400Mbps (8MHz)
Downstream Channel Bonding	Up to 8 channels
Downstream Bandwidth	6MHz / 8MHz
Downstream Input Signal Level	-15dBmV ~ +15dBmV
Upstream Frequency Range	5 ~ 42MHz; 5 ~ 65MHz; 5 ~ 85MHz
Upstream Signal Bandwidth	TDMA: 200/400/800/1600/3200/6400kHz; S-CDMA: 1600/3200/6400kHz
Upstream Output Signal Level	TDMA QAM level range: +8 to +54dBmV (16/32QAM) or +55dBmV (8/16QAM); TDMA QPSK level range: +8 to +58dBmV S-CDMA level range: +8 to +53dBmV (all modes)
Upstream Channel Bonding	Up to 4 channels
Upstream Maximum Speed	120Mbps (4 channels bonding)

Specifications (continued)

Upstream Signal Generator	
Signal Modulation	CW, QPSK, 8QAM, 16QAM, 32QAM, 64QAM
Symbol Rate	160 kS/s, 320 kS/s, 640 kS/s, 1.28 MS/s, 2.56 MS/s, 5.12 MS/s
MER	>38dB; Accuracy ± 2 dB
Frequency Range	5MHz ~ 85MHz
Frequency Adjustable Steps	1MHz
Signal Level Range	8 ~ 60dBmV
Level Adjustable Step	1dB
DS1615	
Size	1U Standard Rack
FSK Tx Frequency	42MHz~120MHz
FSK Tx Level	25dBmV~50dBmV
Modulation type	FSK
Baud Rate	38.4kbps
WIFI	
Frequency	2.4G, 5G
Support Standard	802.11a/ b/g/n
Security Mode	WPA/WPA2/WPA-PSK/WPA2-PSK
Encryption	WEP/AES/TKIP
Test Parameters	SSID; Level; Channel
Others	
RF Input	75 Ω F
USB	USB 1.1
Ethernet	RJ45, 10/100T Ethernet
Display	4.3 inches TFT LCD 480 \times 272 pixels
AC/DC Adapter	AC 100 ~ 240 V/50 ~ 60Hz DC 12V / 3A
Battery	Li-ion, 7.4 V/7.8Ah
Charge Time	~ 4 hours
Working Time	> 6 Hours
Dimension (W \times H \times L)	245mm \times 130mm \times 60mm
Weight	About 1.5kg
Work Temperature	-10 ~ +50 $^{\circ}$ C
Storage Temperature	-20 ~ +60 $^{\circ}$ C

©2017 Deviser Instruments Incorporated. 780 Montague Expressway, Suite 701, San Jose, CA 95131. All rights reserved. Specifications subject to change without notice. All product and company names are trademarks of their respective corporations. Deviser Instruments manufacturing facilities are ISO 9001 certified. Do not reproduce, redistribute, or repost without written permission from Deviser Instruments. DS2600C 170125