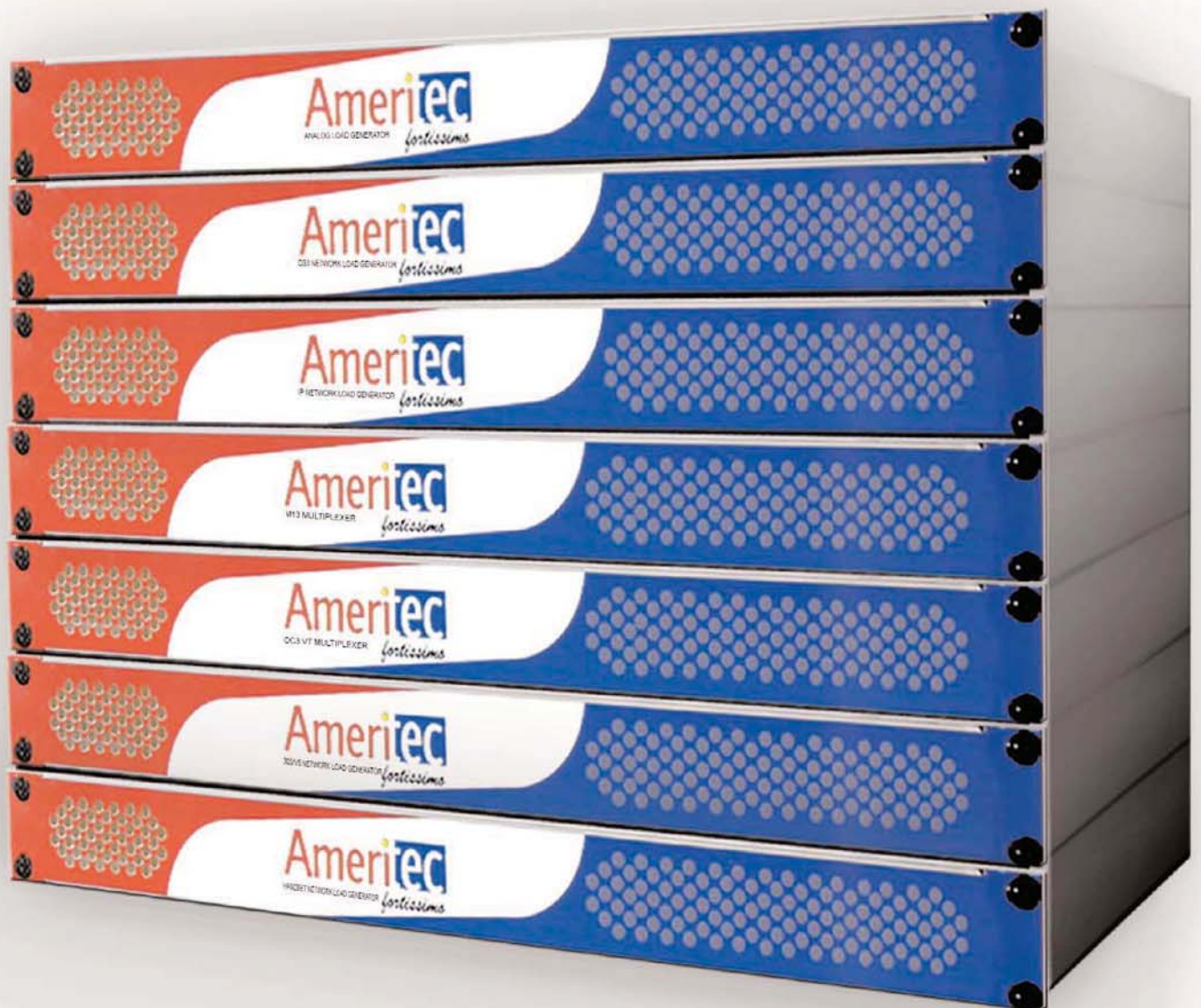


Ameritec

Fortissimo Family of Products

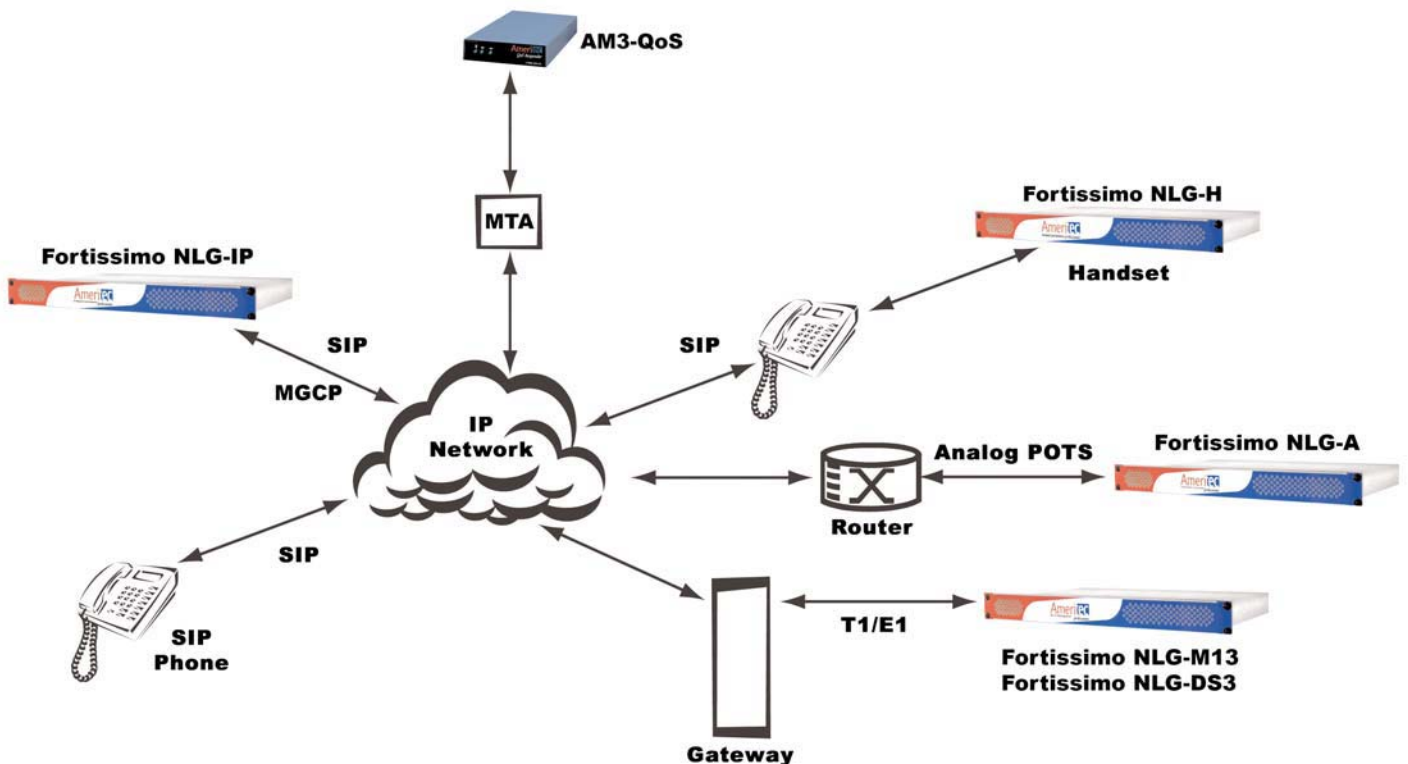


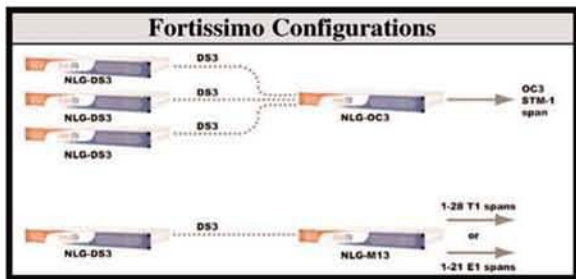
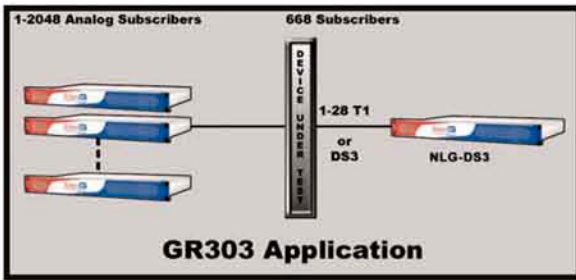
- ▶ Fortissimo is the world's smallest, high-capacity network load generation product designed to test and qualify the voice and packet network.
- ▶ Fortissimo speeds up your system integration, functional and performance testing at an unbeatable price/performance ratio.
- ▶ Fortissimo is designed to place calls to or receive calls from other Allegro, Fortissimo or AM3-QoS units to provide a complete test system of call generation and Quality of Service (QoS) measurements

The Fortissimo family of network load generators represents a significant technological advancement in high-capacity call generation. Designed to meet the requirements of today's developer of both legacy and new generation switches including hardware and software modules. Operators focusing on system integration or revenue and quality assurance will also enjoy the functionality, ergonomics and costs of this solution. The Fortissimo packs the power of 192 simultaneous SIP/MGCP calls, up to 28 × T1/E1 spans, 1 DS3, 1 OC3/STM-1 or 100 × analog POTS (loop/ground) circuits in a unit that takes up 1 rack unit of space.

The Fortissimo comes in seven versions, each with the ability to support Ameritec's industry leading QoS measurement package:

- ▶ Up to 100 2-wire analog loop/ground lines
- ▶ 1 DS3 circuit supporting CAS, PRI, SS7, GR303 signaling
- ▶ Up to 28 T1/E1 circuits
- ▶ Up to 192 SIP/MGCP circuits
- ▶ 1 OC3/STM-1 circuit
- ▶ Up to 50 4-wire handset/headset circuits
- ▶ Up to 32 FAX circuits





Applications

Operation

The Fortissimo products allow the developer to simulate various types of network traffic on a large number of spans or lines without having to consume a large amount of rack space. Maintaining full testing flexibility on a large line count is the premise behind Fortissimo. Each Fortissimo is controlled via a PC workstation over a 10/100 MB Ethernet port and utilizes a Conductor graphical user interface (GUI) that is intuitive and easy to use. Alternately, a command set option allows the user to remotely control units via a Telnet session for test automation applications. Full scripting of call scenarios is accommodated and manipulation of signaling protocols is provided to allow the user to fully test and debug equipment under test before releasing product to the next stage of development. Audio output is provided on the Fortissimo to complete the testing phase so that a developer can further verify the integrity of any call scenario.

Measurements

Long known for providing the most comprehensive set of measurements in the call generation industry, Ameritech has incorporated into every Fortissimo product the ability to simultaneously measure traditional call statistics such as calls originated and completed as well as a comprehensive set of QoS measurements designed to provide packet quality and voice quality scoring. This complete set of measurements provides the developer with PSTN to packet network correlation scores. The ability to utilize our GoldenVoice technology to measure packet loss, jitter, signal to noise ratio, clipping and delay while simultaneously providing R-factor, GMOS, GPSQM, and GPESQ scoring on all lines makes this product an invaluable development tool.

Enhanced Features

A modem QoS feature verifies accurate detection and transport of FAX, Modem and TTY/TTD signals in pass-through scenarios. The Echo Cancellation Test and Voice Echo Response test are features that can be used to detect and characterize Echo and verify operation of Echo cancellers. Synchronized call script



Conductor

Wizard Required Script Setup

Set up the script parameters for the first script. All empty parameter boxes (except for extended digit strings) must be filled in for the test to run correctly. Each parameter is applied to all selected lines.

The Incr. box beside each parameter allows you to add an increment value to each occurrence of the parameter as it is assigned. You can choose any reasonable value as an increment, keeping in mind the parameters are 16 bit integers.

Not all parameters require you to specify an increment, and a blank value is the same as zero.

Script: C:\Kris\11 Test\Allegro\Scripts Shared Source Safe\Analog Orig ID

Parameter #1	Parameter #2	Parameter #3
Parameter	Incr.	Parameter
DialType	2	DigitOff-Time
DigitString	9990001	DigitOn-Time
AnsSpvTimeout	10	DTFallThld
ChkAnswerSupv	1	DTSlowThld
DialDelay	0	HdLevelHigh

< Back Next > Cancel Help

Test Scheduler

Sched 1 | Sched 2 | Sched 3 | Sched 4

Start Time: 9:46:10 AM Run for: 00:01

Start Date: 1/16/2006

Report: Orig Attempts Orig Completes Hours:Minutes

Include Directory: C:\Program Files\Ametec\Conductor\Temporary Files

Unit: NLG Analog Configuration: LS ID.ana

NLG Analog C:\Program Files\Ametec\Conductor\Configuration Files\LS ID.ana

Modify Unit Delete Unit Summary Editor

Clear Sched Start test Save Close Help

Wizard Configuration Save

All necessary data has been entered. If you wish to enter a description of the configuration, enter it into the Configuration Description box below.

To continue, press Finish. Check the appropriate check-box to send the configuration to the unit and initiate a test run. To exit without saving the changes, press Cancel.

Configuration Description

Configuration File Name: C:\Program Files\Ametec\Conductor\Configuration Files\LS ID.ana

Load Configuration to unit when Save complete

Run Test when Load complete

< Back Finish Cancel Help

Line Editor

Configuration File: C:\Program Files\Ametec\Conductor\Configuration Files\LS ID.ana

Script: C:\Kris\11 Test\Allegro\Scripts Shared Source Safe\Analog Orig ID Tone 93Q0001.qsc

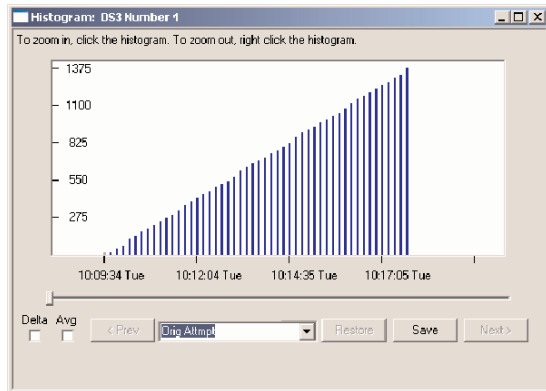
Call Programs and Parameters

Files Wizard View

Copy Paste Fill Down

Line	DialType	DigitString	AnsSpvTimeout	ChkAnswerSupv	DialDelay	DigitOff-Time
1	2	9990001	10	1	0	60
2	2	9990002	10	1	0	60
5	2	9990005	10	1	0	60
7	2	9990007	10	1	0	60
9	2	9990009	10	1	0	60
11	2	9990011	10	1	0	60
13	2	9990013	10	1	0	60
15	2	9990015	10	1	0	60
17	2	9990017	10	1	0	60
19	2	9990019	10	1	0	60
21	2	9990021	10	1	0	60

OK Cancel Help



Statistics

Line Detail Report

Units: NLG Analog

Monday, January 16, 2006, 09:49:58

Start: Monday, January 16, 2006, 09:48:53, Duration: 0 00:01:05

Scripts: Analog Orig ID Tone 93Q0001.qsc, Analog Term ID Tone 93Q0002.qsc

	Orig Attempt	Orig Compl	Term Attempt	Term Compl	Receive ID Test Failed	Receive ID Not Processed	Send ID Test Failed
NLG Analog							
Line							
1	5	5	0	0	0	0	0
2	0	0	5	5	0	0	0
3	5	5	0	0	0	0	0
4	0	0	5	5	0	0	0
5	5	5	0	0	0	0	0
6	0	0	5	5	0	0	0
7	5	5	0	0	0	0	0
8	0	0	5	5	0	0	0
9	5	5	0	0	0	0	0
10	0	0	5	5	0	0	0
11	5	5	0	0	0	0	0
12	0	0	5	5	0	0	0
13	5	5	0	0	0	0	0
14	0	0	5	5	0	0	0

Configuration Summary

Unit Setup Signaling Scripts

Script 1 | Script 2 | Script 3 | Script 4 | Script 5 | Script 6 | Script 7 | Script 8 | Script 9 | Script 10

Script: h:\Shared Source Safe\Analog Orig ID Tone 93Q0001.qsc

Lines: 1,3,5,7,9,11,13,15,17,1

Unit supports 100 lines

Parameter #1	Parameter #2	Parameter #3
Parameter	Incr.	Parameter
DialType	2	DigitOff-Time
DigitString	9990001	DigitOn-Time
AnsSpvTimeout	10	DTFallThld
ChkAnswerSupv	1	DTSlowThld
DialDelay	0	HdLevelHigh

Save Save As Close Help

NLG Analog - Line Control

Enable Disable (x)

Start

	1	2	3	4	5	6	7	8	9	10
0										
10										
20										
30										
40										
50										
60										
70										
80										
90										

Clear Stats

Unselect Close Help

General characteristics

User interface	Windows 2000, XP based GUI
Ethernet port	- One RJ45 connector and two LED indicators per network interface -10/100 BaseT interface - Complies with IEEE 802.3
Dimensions	17" Wide x 1.75" High x 15" Deep
Power	90 to 264 VAC, 47 to 65 Hertz
Weight	12 Pounds (5.4 kg)

Audio monitor

Audio port	Provides audio output for direct connection into PC speakers
Sync. ports	Synchronize multiple Fortissimo units or connect to AMMSG unit of remote testing for QoS measurements

Call programs and scripts

Features	- Commonly used scripts supplied with unit - Scripts created and downloaded from workstation or PC
----------	---

System

Capacity	192 unique IP sessions, 100 analog lines, or 28 digital spans
Call volume	Typically 500 confirmed calls per hour per channel/line (DTMF dialing, tone ID confirmation, 2 unpaired lines)
Line types	- SIP/MGCP calls - Loop start/ground start, 2 wire - T1/E1 spans (CAS, PRI, SS7) - Pulse, DTMF, MFR1 & MFR2 dialing
System start modes	- Synchronous - Random
Test interface	RJ45 (IP), RJ45 (T1/E1), BNC (DS3) amphenol (analog)

Voice channel functions

Detectors	Tone detectors are based on digital signal processors (DSPs) 1 per channel
Call progress detectors	- One detector per line or B-channel - Detects: dial tone, busy, recorder, ring, ring back, supervision, wink
Path confirmation receiver	- One receiver per line or B-channel - Frequency range: 10 to 2500 Hz - Accuracy: 1%, \pm 10 Hz - Sensitivity: 0 dBm to -24 dBm
Signal tone decoders	One receiver per channel
Digit receiver	- Decodes received DTMF, MFR1, MRF2 digits - Dynamic range: 35 dB
Single frequency tone generator	64 selectable tones

Voice path confirmation

Channel path verification voice circuit switched	10 user selectable single tone signals to send unique channel ID tones Encoding scheme 0: 1025 Hz 1: 1150 Hz 2: 1275 Hz 3: 1400 Hz 4: 1525 Hz 5: 1650 Hz 6: 1775 Hz 7: 1900 Hz 8: 2025 Hz 9: 2150 Hz 64 user selectable single tone signals
Circuit switched data	- 511 and 2047 BERT pattern test for 56 kb/s or 64 kb/s channels - 511 bits pattern conforms to ITU-T O.153 - 2047 bits pattern conforms to ITU-T O.152
Packet switched data (PRI only)	Up to 5 user selectable X.25 packets for confirmation

Voice over Packet

Voice path confirmation	GoldenVoice™ signal designed to pass through vocoder
Packet drop out count	Count lost packets for frame sizes of 5, 10, 15, 20, 30, 40 and 100 ms
Measure delays through systems	- Round trip delay \pm 10 ms resolution - One way delay \pm 5 ms resolution
Measure clipping of voice (leading & trailing edge)	Peak and average clipping of standard reference with \pm 5 ms accuracy

Jitter Peak and average jitter of standard reference with ± 5 ms accuracy

Signal-to-noise ratio Average and maximum SNR received (from 0 to 39 dB)

Signal energy Average and maximum GoldenVoice energy received (from 0 to -50 dBm)

Spurious energy Maximum non-GoldenVoice energy received (from 0 to -50 dBm)

Total energy Average and maximum GoldenVoice energy plus extraneous noise received (from 0 to -50 dBm)

GoldenVoiceTM

- Noise received (from 0 to -50 dBm)
- Ten programmed Golden Voice tone signals, used to send the ID from each side encoded as three tone sequences

QoS Calculation of R-factor GMOS, GPSQM, GPESQ, R-factor is based upon E-model in ITU-T G.107

Digit generators

Dialed digit strings are of unlimited length

Dial pulse generator

- Programmable dial speed: 1 pps to 999 pps
- Dial break: 1 to 99%
- Inter-digit time: 1 to 999 ms

Digit generators

- One digit generator per line
- Dialing codes: MFR1, MFR2, DTMF
- Default level: -9 dBm
- Default frequencies: Nominal + 0.005%
- Programmability: Each line individually
- Programmable for level 0 dBm to -50 dBm in 1-dB steps for each frequency component
- Programmable frequency range: Up to 12.5 above or below nominal in 0.1% steps for each frequency component

Printout and reports - call statistics

Manual reports

- Call statistics for each line or channel
- Totals for all lines and channels

Automatic reports

- Prints automatically on the hour or every half or quarter hour
- Contents of each column in the printout are user selectable

Call statistics for each originate line or channel

- Call attempt count
- Call completion count
- Delayed start signal count
- No start signal count
- No alert signal count
- No voice path or B-channel confirmation count
- Busy signal encountered count
- No answer signal count
- Ring-time count (ISDN PRI)
- Average dial tone delay
- Average post dial delay
- Custom code report count (programmable in test script)

Call statistics for each terminate line or channel

- Attempted calls count
- Completed calls count
- Custom code report count (programmable in test script)

VoP statistics

Signal analysis tests

- Average and maximum dropout duration (ms)
- Dropouts categorized into 5 Bins
- Average and maximum front clip duration (ms)
- Front clips categorized into 5 Bins
- Average and maximum back clip duration (ms)
- Back clips categorized into 5 Bins
- Average and maximum jitter duration (ms)

Dropout tests

- Average and maximum dropout duration (ms)
- Dropouts categorized into 5 Bins
- No tone detected
- Tone lost

One-way delay tests

- Average, minimum, and maximum one-way delay (ms)
- One-way delay categorized into 5 Bins

Round trip delay tests

- Average, minimum, and maximum round trip delay (ms)
- Round trip delay categorized into 5 Bins

GoldenVoice tests

- Minimum and maximum total energy
- Minimum and maximum signal to noise ratio
- Minimum and maximum GoldenVoice energy
- Maximum spurious energy overflow
- Spurious energy overflow
- Low signal to noise ratio

GMOS tests

- Average and maximum percent (%) drop
- Drop packet size (ms)
- Drop test time (s)
- Average and maximum one-way delay (ms)
- Average and minimum circuit noise
- Minimum and maximum receive level
- Average and maximum round trip delay (ms)
- Terminating channel indicator
- Average and maximum SNR

MQoS tests

- Equivalent data rate Kbps
- Total Bit Errors
- Total Block Errors
- Round trip delay
- MQoS score
- FAX pages sent per hour

Echo Celler tests

- Average energy level
- Max energy level
- Energy threshold exceeded

Voice Echo Response tests

- Average energy level per time bin

Digit generators - dialed digit strings are of unlimited length

Dial pulse generator

- Programmable dial speed: 1 pps to 999 pps
- Dial break: 1 to 99%
- Inter-digit time: 1 to 999 ms

Digit generators:

- One digit generator per line
- Dialing codes: MF R1, MF R2, DTMF
- Default level: -9 dBm
- Default frequencies: Nominal $\pm 0.005\%$
- Programmability: Each line individually
- Programmable for level 0 dBm to -50 dBm in 1 dB steps for each frequency component
- Programmable frequency range: Up to 12.5% above or below nominal in 0.1% steps for each frequency component

Ordering information

Mainframe/Chassis/Test Set

NLG-A	Fortissimo 100-line Analog POTS Call Generator
NLG-DS3	DS3 Network Load Generator
NLG-M13	DS3/M13 Multiplexor
NLG-OC3-VT	DS3/OC3/STM-1 Mutlplexor
NLG-IP	Fortissimo 192-IP session ETH 10/100Call Generator

Options

250532	Fortissimo Command Set Feature
250533	Fortissimo G.729 Software
250538	Fortissimo Extended Feature Set

Accessories

190005	Fortissimo Protocol Development Kit
240091	XpresScript Visual Scripting Tool for Fortissimo

Cables

480182	RJ45 to RJ45 cable, 5 ft.
480163	RJ45 Modular to open end, 10' ea.
480164	RJ45 Modular to Minigator, 10' ea.
480165	RJ45 Modular to Sleeve, 10' ea. A

Please ask for further information on:

- ▶ VoIP test applications including GMOS, PESQ, etc.
- ▶ Overview of supported protocol variants

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