

Specification for the Digital Communications Analyzer

WG PFA-35

Generator

INTER- FACE	V.24/RS232		V.11/X.24	V.35	V.36	RS449	G.703 Co-dir.	G.703 2048 kbit/s 704 kbit/s
	SYNC	ASYN						
Config. DTE	FDX Built-in	FDX Built-in	Built-in	Via Adaptor	Via Adaptor	Via Adaptor		
Config. DCE	FDX Via Adaptor	FDX Via Adaptor	Via Adaptor	Via Adaptor	Via Adaptor	Via Adaptor	Built-in	Built-in
Bit Rates	50 bit/s to 38.4 kbit/s program. to 1 bit/s resolution plus: 48, 56, 64, 72 kbit/s	50 bit/s to 38.4 kbit/s program. to 1 bit/s resolution plus: 48, 56, 64, 72 kbit/s	Fixed freqs. 1.2, 2.4, 4.8, 8, 9.6, 16, 19.2, 32, 48, 56, 64, 72, 128, 144, 192, 1544 kbit/s also: n x 64 kbit/s n = 1 to 32 and n x 56 kbit/s, n = 1 to 27	As V.11	As V.11	As V.11	48, 56, 64, 72, 144 kbit/s n x 64 kbit/s n = 1 to 8	2048 kbit/s 704 kbit/s
Physical	ISO 2110 (25-way, D-type, male)	ISO 2110 (25-way, D-type, male)	ISO 4903 (15-way, D-type, male)	See Access- ories.	ISO 4902 (37-way D-type, DTE/DCE)		CF (balanced) BNC (unbalanced)	CF (balanced) BNC (unbalanced)
Output imped.	—	—	100 Ω max.	100 Ω $\pm$ 50 Ω	100 Ω max.	100 Ω max.	—	—
Output Voltage	$\pm$ 5 to $\pm$ 12 V into 3 to 7 k Ω	$\pm$ 5 to $\pm$ 12 V into 3 to 7 k Ω	2 V min. into 100 Ω	0.55 V $\pm$ 20 % into 100 Ω	2 V min. into 100 Ω	2 V min. into 100 Ω	1 V, $\pm$ 10 % into 120 Ω ; 0.79 V, $\pm$ 10 % into 75 Ω	3 V, $\pm$ 10 % into 120 Ω ; 2.37 V, $\pm$ 10 % into 75 Ω

Note: In DTE emulation, using an external clock source, any frequency between 50 bit/s and 2048 kbit/s can be used.

Receiver

INTERFACE	V.24/RS232		V.11/X.24*	V.35*	V.36*	RS449*	G.703 Co-dir.	G.703 2048 kbit/s 704 kbit/s
	SYNC	ASYN						
Input imped.	3 to 7 k Ω	3 to 7 k Ω	120 Ω $\pm$ 10 Ω	100 Ω $\pm$ 10 Ω	120 Ω , $\pm$ 10 Ω	120 Ω , $\pm$ 10 Ω	Terminating 75 Ω /120 Ω Bridging tapping loss < 0.12 dB @ 1 MHz	Terminating 75 Ω /120 Ω Bridging tapping loss < 0.12 dB @ 1 MHz
Return Loss	—	—	—	—	—	—	$\geq$ 20 dB 20 kHz to 3MHz	$\geq$ 20 dB 20 kHz to 3MHz
Input Sensitivity	$\pm$ 3 to $\pm$ 12 V	$\pm$ 3 to $\pm$ 12 V	$\pm$ 0.3 to $\pm$ 6 V	$\pm$ 0.3 to $\pm$ 6 V	$\pm$ 0.3 to $\pm$ 6 V	$\pm$ 0.3 to $\pm$ 6 V	0 to -30 dB @ 64 kbit/s	0 to -33 dB unequalised

* V.11 receiver is type 0

Framed G.703 Test Modes

RX Framing PCM30, PCM30 CRC, PCM31, PCM31 CRC
or unframed
G.703 digital line code HDB3, AMI
G.703 jitter tolerance and transfer to ITU-T Rec. G.823
Test pattern analysis
V.11 drop n x 64 kbit/s
Rx Audio
Rx Signalling

RX/TX

As RX plus:

Test pattern generation Single timeslot
n x 64 kbit/s timeslots
Drop/Insert Drop n x 64 kbit/s timeslots
Insert n x 64 kbit/s timeslots
Drop and Insert 1 timeslot
to/from V.11 interface

2 Mbit/s internal clock offset up to $\pm$ 150 ppm
Programmable Si, Sa, A and E bits, and NMFAS

THROUGH

As RX/TX plus:

Drop and/or insert n x 64 kbit/s (1-31)
timeslots from/to V.11 interface

DELAY

Framed and unframed 2 Mbit/s

Range 0 to 10 s
Resolution 1 μ s

MUX

Receiver as for RX/TX mode. Error analysis on BER pattern in
selected timeslots.

Unframed transmitter on V.11, V.24, V.35, V.36/RS449, (with
DTE emulation) or G.703 co-dir.

Transmit and receive BER patterns identical.

DEMUX

Transmitter as for RX/TX mode. BER pattern inserted in
selected timeslots.

Unframed receiver on V.11, V.24, V.35, V.36/RS449, (with DTE
emulation) or G.703 co-dir.

Transmit and receive BER patterns identical.

Framed Monitor

Simultaneous monitor and generation of the Si, Sa, A and E
bits of the NFAS word in timeslot 0. Simultaneous monitor and
generation of the NMFAS. Monitor and display of:
FAS, NFAS, MFAS, NMFAS and CRC MFAS words. 8 bit
digital code word in any selected timeslot. Channel Associated
Signalling status of all 30 telephone channels with idle/busy
indication.

Level and Frequency

Digital representation of sinusoidal signals in a timeslot.
(A-law coding to ITU-T Rec. G.711).

Tx frequency range 5 Hz to 3998 Hz in steps of 5 Hz

Tx level range -55 dBm0 to +3 dBm0 in steps of 1 dB

Rx Level measurements -80 dBm0 to +5 dBm0

X.50 Test Modes

X.50 Interfaces:

V.11 DTE
V.35 DTE and DCE
V.36 DTE and DCE
RS 449 DTE and DCE
G.703 co-directional

X.50 64 kbit/s:

RX/TX

Division 2 and 3 framing

Test pattern insertion/evaluation... n x 600 bit/s, 19.2, 48 kbit/s

Idle code... 1111, 0000, 2⁷-1

Programmable Housekeeping bits A-H

Programmable Idle/BERT Status bits

Display of receive Housekeeping and Status bits.

X.50 Frame analysis.

THROUGH

As RX/TX, with non-BERT octets connected through from receiver to transmitter.

D&I

As THROUGH with non-Drop/Insert octets connected through from receiver to transmitter.

Drop/Insert via SYNC V.24

with DCE emulation: 600 bit/s, 1.2, 2.4, 4.8, 9.6, 19.2, 48 kbit/s

Drop and Insert bit rates equal.

MUX

X.50 receiver as for RX/TX mode. Error analysis on BER pattern in selected octets.

Unframed transmitter on V.11, V.24, V.35 or V.36/RS 449, with DTE emulation. Transmit and receive BER patterns identical.

DEMUX

X.50 Transmitter as for RX/TX mode. BER pattern inserted in selected octets.

Unframed receiver on V.11, V.24, V.35 or V.36/RS449, with DTE emulation. Transmit and receive BER patterns identical.

X.50 PCM 2 Mbit/s

X.50 PCM Interfaces

G.703 2 Mbit/s 75 ohm unbalanced
120 ohm balanced
HDB3/AMI

RX/TX

As X.50 RX/TX, with X.50 frame carried in one timeslot of G.704 Framed 2 Mbit/s signal. 2 Mbit/s framing PCM30, PCM31, PCM30C, PCM31C, with transmit and receive X.50 timeslots independently selected.

BER pattern analysis as for X.50 RX/TX, with 2 Mbit/s Frame analysis and X.50 Frame analysis.

MUX

Receiver as for X.50 PCM RX/TX mode. Error analysis on BER pattern in selected octets.

Unframed transmitter on V.11, V.24, V.35 or V.36/RS 449, with DTE emulation. Transmit and receive BER patterns identical.

DEMUX

Transmitter as for X.50 PCM RX/TX mode. BER pattern inserted in selected octets.

Unframed receiver on V.11, V.24, V.35 or V.36/RS 449, with DTE emulation. Transmit and receive BER patterns identical.

Unframed Test Modes

Interfaces, built in or via adaptors:

V.11 DTE and DCE
V.35 DTE and DCE
V.36 DTE and DCE
RS449 DTE and DCE
V.24 DTE and DCE, SYNC and ASYNC
G.703 co-directional
HDB3/AMI 2048/704 kbit/s
Bit rates as table.

General

Test Patterns

PRBS 2⁶-1, 2⁹-1, 2¹¹-1, 2¹⁵-1

Alternating 1 s and 0 s 1010

All 1 s 1111

All 0 s 0000

6, 8, 12 and 16 bit programmable word

Quick Brown Fox patterns

Logic Sense normal or inverted

Signalling code 4 bit programmable word

PCM Idle code 8 bit programmable word

X.50 Idle code 1111, 0000, 2⁷-1

Error Injection

G.703 Framed operation

Bit, Code, FAS, CRC errors

Single, ratio or frequency

Ratio 1E-3, 1E-4, 1E-5, 1E-6

2E-3, 2E-4, 2E-5, 2E-6

5E-4, 5E-5, 5E-6, 5E-7

Frequency 0 to 999 errors/sec

X.50 framed operation

Bit, FAS errors

Ratio 1E-1, 1E-4, 2E-1, 2E-4,

5E-1, 5E-4

Burst: FAS, AIS 5-995 bits

n in 10 FAS bits

Unframed operation

Bit, Code errors

Single, ratio or frequency

Ratio 1E-3, 1E-4, 1E-5, 1E-6

2E-3, 2E-4, 2E-5, 2E-6

5E-4, 5E-5, 5E-6, 5E-7

Frequency (G.703 2 Mbit/s only) 0 to 999 errors/sec

Clocking

Clock source transmitter G.703 2048 kbit/s

and co-directional Internal

External (from V.11)

From received signal

Clock source (all other interfaces)

DTE ext TC, RC or ext RC, int TTC

DCE int TC, RC or ext TTC, int RC

Error and Alarm Indication

– One green LED indicates that the circuit is functioning correctly.

– One red programmable summary LED indicates the occurrence of any detected alarm or error event. A warning message is displayed on the LCD to indicate which error or alarm has occurred.

A beeper is sounded when the red summary LED is illuminated.

– Fourteen red LEDs indicate individual alarms and errors.

– One yellow LED indicates low battery condition.

LCD display and printout of result parameters

Autoprinted total	Autoprinted alarm	Printed text results	Printed hist table	Printed histogram	On screen hist	On screen text	LED	
•	•	•	•	•	•	•	•	No Signal
•	•	•	•	•	•	•	•	AIS
•	•	•	•	•	•	•	•	All zeros
•	•	•	•	•	•	•	•	All ones
•	•	•	•	•	•	•	•	Sync loss
•	•	•	•	•	•	•	•	Slip
•	•	•	•	•	•	•	•	Byte sync loss
•	•	•	•	•	•	•	•	Line rate
•	•	•	•	•	•	•	•	Bit rate
•	•	•	•	•	•	•	•	Total bits
•	•	•	•	•	•	•	•	Bit errors
•	•	•	•	•	•	•	•	Code errors
•	•	•	•	•	•	•	•	Block errors
•	•	•	•	•	•	•	•	No clock
•	•	•	•	•	•	•	•	Parity errors
•	•	•	•	•	•	•	•	Character errors
•	•	•	•	•	•	•	•	Character error ratio
•	•	•	•	•	•	•	•	BER
•	•	•	•	•	•	•	•	BLER
•	•	•	•	•	•	•	•	Code error ratio
•	•	•	•	•	•	•	•	PCM Frame sync loss
•	•	•	•	•	•	•	•	PCM Multiframe sync loss
•	•	•	•	•	•	•	•	PCM Distant frame alarm
•	•	•	•	•	•	•	•	PCM Distant multi-frame alarm
•	•	•	•	•	•	•	•	PCM FAS errors
•	•	•	•	•	•	•	•	PCM CRC errors
•	•	•	•	•	•	•	•	Total frames
•	•	•	•	•	•	•	•	Total Multiframe
•	•	•	•	•	•	•	•	PCM FAS Word error ratio
•	•	•	•	•	•	•	•	X.50 Frame sync loss
•	•	•	•	•	•	•	•	X.50 FAS errors
•	•	•	•	•	•	•	•	X.50 Alarm bit
•	•	•	•	•	•	•	•	X.50 FAS BER
•	•	•	•	•	•	•	•	Total seconds
•	•	•	•	•	•	•	•	Error free secs
•	•	•	•	•	•	•	•	Errored secs
•	•	•	•	•	•	•	•	Sev errored secs
•	•	•	•	•	•	•	•	Non Sev errored secs
•	•	•	•	•	•	•	•	Degraded mins
•	•	•	•	•	•	•	•	Non Degraded mins
•	•	•	•	•	•	•	•	Available time
•	•	•	•	•	•	•	•	Unavailable time

Codes CCITT-5 (ASCII)
Bits per character 7 or 8
Stop bits 1 or 2
Handshaking None, CTS, XON/XOFF, Slow (8 char/sec)
Parity 7 bits/char : none, odd, even, mark or space
8 bits/char : none, odd, even

Front Panel

Display 42 character x 8 line LCD with LED backlight
Keyboard Numerical keypad, 4 cursor keys,
2 contrast keys, 6 softkeys, security,
main menu, on and off keys
LEDs 2 summary LEDs, 14 alarm/error LEDs, option LED,
low battery LED

Stores/Memory

8 test result memories each containing numeric results and
histograms.
Histogram storage capacity 60 days of 1 hour resolution
60 hours of 1 minute resolution
8 configuration stores each containing instrument setup
configurations.

Security

A store or memory may be locked to prevent accidental
deletion and may be unlocked using the security key.
Results are saved at power-off.
Keyboard can be locked except for on/off.

Self Check

Comprehensive self check at power on.

General Specifications

Languages English, German, Italian, French and Spanish
Power supply
Batteries, rechargeable (fitted) 5 x Ni-Cd C-size cells
Operating time
(using rechargeable batteries) 8 hours approx
Charging time 14 hours approx
Battery low LCD/LED warning before auto switch-off
Auto switch-off 4 minutes after last action
(not if test is running) or battery very low
External supply via LNT-1
Ambient Temperature
Operating temperature range 0 to +50 °C
Storage temperature range -20 to +60 °C
Dimensions (h x d x w) 72 x 136 x 195 mm
Weight 1.7 kg approx

Printer and Remote operation

Interface V.24/RS232
Simulates DTE or DCE (via adaptor)
Framing Async
Clock rates ... 300, 600, 1200, 2400, 4800, 9600, 19200 baud

Ordering Information

Digital Communications Analyzer WG PFA-35 BN 4535/50 WG PFA-35 without X.50 BN 4535/60

complete with:

a.c. adaptor/charger LNT-1 with mains lead.

Please specify the required mains lead from the list below:

Standard European power plug

U.S. type power plug

U.K. type power plug

Australian type power plug

K 490

K 491

K 492

K 493

Accessories (available at extra cost)

V.11 DCE adaptor cable

K 1505

V.36/RS 449 DTE adaptor cable

K 1506

V.36/RS 449 DCE adaptor cable

K 1507

V.24/RS 232 DCE adaptor cable

K 1512

External clock adaptor

K 1513

Downloading cable

K 1515

Printer cable

K 1500

V.35 Adaptors (jackscrew fixing)

V.35 DTE adaptor 1.6 mm dia pin male (AMP)

K 1508

V.35 DCE adaptor 1.6 mm dia pin female (AMP)

K 1509

V.35 DTE adaptor 1.6 mm dia pin male (Positronic)

K 1525

V.35 DCE adaptor 1.6 mm dia pin female (Positronic)

K 1526

V.35 Adaptors (clip fixing)

V.35 DTE adaptor 1.0 mm dia pin male (Positronic)

K 1510

V.35 DCE adaptor 1.0 mm dia pin female (Positronic)

K 1511

Performance Test Software PTS-120

BN 4533/01

Equipment case

BN 4523/00.04

for storage and transportation of WG PFA-35,
a.c. adaptor/charger LNT-1, cables etc.

Equipment case

BN 4540/00.02

for storage and transportation of WG PFA-35, a.c. adaptor/charger LNT-1,
PCM-23, printer (not supplied) with a.c. mains charger, cables etc.

Soft case

BN 4518/00.08

suitable for WG PFA-35, printer, accessories and manuals