NETWORK DATA ANALYZER
MD6430A
50 bit/s to 10 Mbit/s

CE GPIB OPTION

One Instrument for Installation and Maintenance

The MD6430A Network Data Analyzer can measure errors on 13 different interfaces for leased lines (64 kbit/s to 6.3 Mbit/s), ISDN (BRI, PRI), and V/X series interfaces, making it suitable for installation and maintenance of a variety of networks.
Measurements include bit errors, alarms, delay time, frequency, digital level measurements, user pattern send/trace, etc., all of which can be displayed on the large color LCD.
Error performance (ITU-T G.821, G.826, M.2100) is available with various pseudorandom patterns and user patterns up to 1024 characters. Frame Relay measurement function, ISDN signaling function (optional), and a simultaneous two-channel monitoring function are also provided. Single button “quick” function and touch-screen ensure easy operation. This unit offers the user sophisticated functions required for installation and maintenance in a small compact unit.

Features

- One unit supports installation and maintenance of leased lines, ISDN, and frame relay
- Single button quick test operation
- Lightweight, with a battery-operated function

Applications

• Many applications ranging from low-speed modems to high-speed digital lines

The MD6430A can evaluate the quality of lines ranging from low-speed modems to high-speed digital lines spanning 50 bit/s to 10 Mbit/s.

• Support for various interfaces

The MD6430A supports G.703 64k, I.430/I-430a 192k, G.703/G.704/I.431 1.5M, 2M, 2M CMI, 6.3M, V.24/V.28, V.35, V.36, RS-449, X.20, X.21, TTL/CMOS interfaces in a number of optional units designed to meet customer needs.

Units	Interfaces	Uses
MU643000A	G.703 64k, I.430/I430-a 192k, G.703/G.704/I.431 1.5M, G.703/G.704/I.431 2.0M, 2M CMI, G.703/G.704 6M	Europe and Japan
MU643000B	G.703 64k, I.430/I430-a 192k, G.703/G.704/I.431 1.5M, 2M CMI, G.703/G.704 6M	Japan
MU643000C	G.703 64k, I.430/I430-a 192k, G.703/G.704/I.431 2.0M	Europe

Note: All interface units support V.24/V.28, V.35, V.36, RS-449, X.20, X.21, and TTL/CMOS.

• Wide variety of measurement functions

Various measurements, such as error, alarm, clock slip, delay, frequency, and digital level can be performed. Also, can send user patterns with tracing functions.

• Frame relay measurements

Frame relay network connections (conforming to PVC and ITU-T Q.933 Annex A) can be tested by the MD6430A. The user can also monitor the congestion status such as FECN, BECN, and CLLM.

• Optional ISDN signaling functions (BRI, PRI)

The unit can be connected to ISDN networks so that both voice communication and error measurement can be performed.

• Error data analysis and storage functions

Error data can be collected in log or histogram format. This data can also be stored in internal memory or on a floppy disk for later analysis.

• Touch-screen

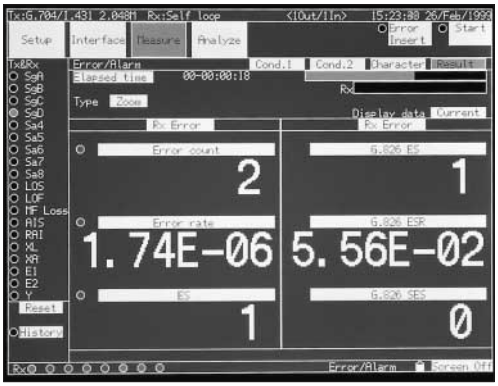
The touch-screen, large color LCD, and pop-up menus provide a much better GUI operating environment.

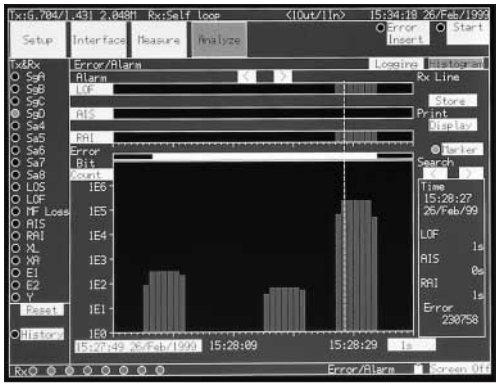
• Battery operation

When a commercial power supply is not available, the optional battery pack provides operation for up to 3 hours, and 5 hours in power save operation.

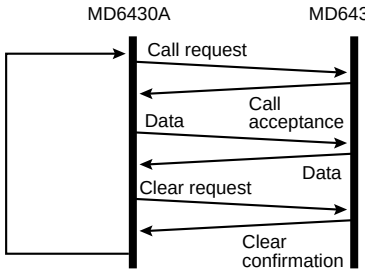
• Full range of error measurement screens

Various measurement items can be displayed simultaneously for error count, error rate, block error count, clock slip count, character error count, error performance (G.821, G.826, M.2100), HDLC error (bad frame, abort frame), and various types of alarms. The user can select the desired items and can display them using the zoom function.

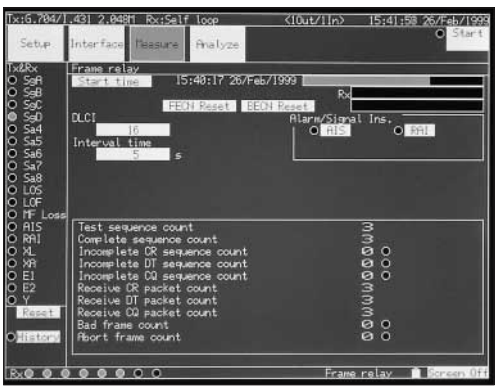




• Supports frame relay measurements
Specific DLCI connections can be checked. PVC status checking procedures are supported.

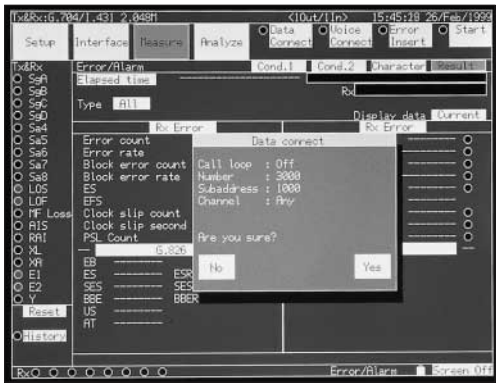


Frame relay measurement sequence



• Substantial analysis functions
Error status and alarm condition can be logged and displayed as histograms. The received data can also be captured.

• Supports ISDN networks (BRI, PRI)
The unit can be connected to the ISDN public telephone network. Return testing using one unit can be done by using the call loop function as below.



• Voice channel function
The CODEC function permits voice communications over a specified channel. Simultaneous voice communications and measurements are possible.

• Easy operation
The touch-screen and pop-up menus are quick and user-friendly, making operation easy for all levels of expertise.

Specifications

Interface	High speed: G.703 64k, I.430/I430-a 192k, G.703/G.704/I.431 1.5M*1, *2, G.703/G.704/I.431 2.0M*1, *3, 2M CMI*1, *2, G.703/G.704 6M*1, *2 (2-wire simultaneous monitoring) Low speed: V.24/V.28, V.35, V.36, RS-449, X.20, X.21, TTL/CMOS (Send/receive simultaneous monitoring)
Clock (high-speed interface)	Internal clock: 64 kbit/s, 1.544 Mbit/s*1, *2, 2.048 Mbit/s, 6.312 Mbit/s*1, *2 (accuracy ≤±5 ppm) External clock: 64k + 8k or slave sync to received data (slave oscillation range: ≤±100 ppm)
G.703 64k clock mode	Centralized clock, codirectional clock
Code law (high-speed interface)	G.703 64k: AMI I.430/I430-a 192k: AMI G.703/G.704/I.431 1.5M: AMI/B8ZS*1, *2 G.703/G.704/I.431 2.0M: AMI/HDB3*1, *3 2M CMI: CMI G.703/G.704 6M:B8ZS*1, *2
Impedance	64k: 110 Ω/HIGH, 192k: 50/100 Ω/HIGH, 1.5M:100 Ω/HIGH, 2 M:75/120 Ω/HIGH, 2M CMI: 110 Ω/HIGH, 6M: 75 Ω/HIGH
Frames (high-speed interface)	G.703/G.704/I.431 1.5M*1, *2: 12MFP (G.704), 24MFP (G.704), 24MFP (NTT), unframe G.703/G.704/I.431 2.0M*1, *3: 16MFP (30B + D), 16MFP (31B), 2MFP (30B + D), 2MFP (31B), Unframe 2M CMI*1, *2: PBX (TTC), CRV, ST (send only), unframe G.703/G.704 6M*1, *2: 4MFP (G.704), unframe
Data bit rate (high-speed interface)	64k x n: 64 to 6272 kbit/s (n =1 to 98*4 , sequential or mixed configuration may be selected.) 56k (1-7) x n: 56 to 5488 kbit/s (n =1 to 98*4) 56k (2-8) x n: 56 to 5488 kbit/s (n =1 to 98*4) 8k x n: 8, 16, 32 kbit/s 2.4k x n: 2.4 to 48 kbit/s (n = 1 to 20, sequential or mixed configuration may be selected for X.50 20 multiframe.) 0.6k x n: 0.6 to 48 kbit/s (n = 1 to 80, sequential or mixed configuration may be selected for X.50 80 multiframe.) Others: Signaling, 1.544 Mbit/s
Send clock (low-speed interface)	Internal clock Sync (ST1): 50 bit/s to 10 Mbit/s (5 bit/s steps. However, V.24/V.28 and X.20 up to 200 kbit/s) Async: 50, 75, 100, 110, 150, 200, 256, 300, 400, 500, 512, 600, 768, 800, 1k, 1.2k, 1.6k, 1.8k, 2k, 2.4k, 2.56k, 3k, 3.2k, 3.6k, 4.8k, 7.2k, 8k, 9.6k, 12k, 12.8k, 14.4k, 16k, 16.8k, 19.2k, 28.8k, 32k, 38.4k, 46k, 48k, 50k, 56k, 56.6k, 64k, 72k, 76.8k, 115.2k (bit/s) Self oscillation accuracy: ≤±5 ppm External clock (ST2, RTS): Frequency for each interface of 50 to10 Mbit/s (may be inverted.)
Receive clock (low-speed interface)	External clock (ST, RTS): Frequency for each interface of 50 to 10 Mbit/s (May be inverted) Internal clock (Async): 50, 75, 100, 110, 150, 200, 256, 300, 400, 500, 512, 600, 768, 800, 1k, 1.2k, 1.6k, 1.8k, 2k, 2.4k, 2.56k, 3k, 3.2k, 3.6k, 4.8k, 7.2k, 8k, 9.6k, 12k, 12.8k, 14.4k, 16k, 16.8k, 19.2k, 28.8k, 32k, 38.4k, 46k, 48k, 50k, 56k, 56.6k, 64k, 72k, 76.8k, 115.2k (bit/s)
Error measurement pattern	Pseudorandom pattern: PRBS 6, 7, 9, 11, 15, 19, 20, 23, RPRBS 20 (reversed PRBS20), QRSS, positive/negative logic Programmable pattern: 8 bit repetitive (start-stop sync: 5 to 8 bits) Code pattern: 1:1, ALL 1, ALL 0 User pattern: 1 to 1024 characters (1 character steps), for character error measurement
Send pattern	User pattern: 1 to 128 kbyte
Error insertion	Error type: bit, bit + code, code Insertion types Single: 1 bit error inserted each time insert button pressed Repeat: 1 bit error inserted each second Cyclic: 2.5E-1 to 1.7E-7
Start-stop synchronization	Start bit length: 1 bit Stop bit length: 1, 1.5, 2 bits Data length: 5, 6, 7, 8 bits Parity: None, odd, even
Error/alarm measurement	Detected errors: Bit, code, parity, CRC, frame, character Measurements: Error count, error rate, block error count, block error rate, ES, EFS, clock slip, clock slip seconds, pattern sync loss count/time, frame sync loss time, alarm time, signal loss time, AC power loss time Error performance: G.821, G.826, M.2100 Measurement modes Single: 1 s to 99 d 23 h 59 min 59 s Repeat: 1 s to 99 d 23 h 59 min 59 s Manual: 1 y max. Measurement range Error rate: 1.00E-15 to 1.00E00, Error count: 0 to 9.99E15
Pattern trace	Trace byte count: 1 Mbit max. Trace start trigger: Manual, code detect Trace stop trigger: Manual, code detect, code mismatch detect, trace byte count Trigger detect delay: 0 to 8,000 bytes
Frequency measurement	Measurement range: DC to 10 MHz, Accuracy: ≤ (±5 ppm ±1 digit)
Delay time measurement (Sync. mode only)	Measurement range: 0 to 16 s (0.001 ms steps)
Frame relay measurement	Measurement items: Correct test packet count, lost test packet count, HDLC bad frame count, HDLC abort frame count PVC connect confirmation test: To MD6430A or circuit loopback test (Conforms to ITU-T Q.933 Annex A) DLCI: 16 to 991 (1 steps) Test packet send interval time: 5 to 30 s (1 s steps) Traffic congestion status monitoring: BECN, FECN, CLLM message detection (Conforms to ITU-T Q.922 Annex A)
Digital level measurement	Code law: A-law, μ-law Measurement range: –60 to +3 dBm (0.1 dBm steps) Send pattern: 0 dBm, 1 kHz pattern (Conforms to ITU-T G.711)

Continued on next page

ISDN calling/called function	INS64, INS1500 (Option: MU643000A/B-01), ETS1 ISDN (Option: MU643000A/C-02)
MUX/DEMUX	Able to drop/insert specified channels in high-speed interface through X.21 interface at 64k x n (n = 1 to 98)
Voice communication	Voice communication possible in any TS in high-speed interfaces (except G.703 64 kbit/s)
Error analysis	Displays sequential error/alarm measurement data and graphs
Signal monitor lamp	Indicates status of each signal line
External printer	Interface Centronics, D-sub 25-pin connector
External printer output	Enables printout of error measurement data Measurement start time: Prints time and measurement conditions During measurement: Prints specified error and alarm occurrence at each detected instance or at predefined time interval Measurement stop time: Prints measured total results Prints on screen contents
Display	Color TFT-LCD (8.4 inch)
Remote interface	RS-232C, D-sub 9-pin connector, GPIB (option)
Memory	3.5 inch FDD
Built-in timer	Year, month, day, hour, minute, second
Power supply	AC: 85 to 250 V, DC: Lithium ion battery (rechargeable, optional accessory), 50 VA
Battery operation time	3 h (max.) ∗5 h when using power save function
Operating temperature	0 to +50˚C, (FDD and at battery usage: +5 to +40˚C)
Dimensions and mass	290 (W) x 194 (H) x 94 (D) mm, ≤4.2 kg (excluding battery)
EMC	EN61326: 1997/A2: 2001 (Class A), EN61000-3-2: 2000 (Class A), EN61326: 1997/A2: 2001 (Annex A)
LVD	EN61010-1: 2001 (Pollution Degree 2)

∗1: Specification when using MU643000A Datacom Interface
∗2: Specification when using MU643000B Datacom Interface
∗3: Specification when using MU643000C Datacom Interface
∗4: Max. n value depends on interfaces

Ordering information

Please specify model/order number, name, and quantity when ordering.

Model/Order No.	Name
	Main frame
MD6430A	Network Data Analyzer
	Standard accessories
Z0695	AC adapter: 1 pc
	Power cord: 1 pc
Z0406A	Touch pen (for touch panel): 1 pc
Z0402A	Protective cover (protects display): 1 pc
W1542AE	MD6430A operation manual (includes MU643000A/B/C): 1 copy
W1543AE	MD6430A remote control operation manual (includes MU643000A/B/C): 1 copy
Z0417	MD6430A sample program (remote sample program): 1 pc
Z0403A	Belt with hook (MD6430A carrying belt): 1 pc
	Option
MD6430A-01	GPIB
	Units
MU643000A	Datacom Interface Unit (for Europe and Japan)
MU643000B	Datacom Interface Unit (for Japan)
MU643000C	Datacom Interface Unit (for Europe)
	Options
MU643000A-01	JT-Q921/Q931 ISDN signaling
MU643000A-02	ETSI ISDN signaling
MU643000B-01	JT-Q921/Q931 ISDN signaling
MU643000C-02	ETSI ISDN signaling
MU643000A-22	CAS/FAS option (for Europe and Japan)
MU643000B-22	CAS/FAS option (for Japan)
MU643000C-22	CAS/FAS option (for Europe)
	Optional accessories
Z0619	Lithium ion battery pack (battery pack for main frame)
B0441	Hard carrying case
B0442	Soft carrying case
B0443	Rack mount kit
A0006	Headset
J1026A	GPIB cable (for MD6430A-01's accessory), 2 m
J0654A	Serial interface cross cable [D-Sub 9-pin (female) · D-Sub 9-pin (male)], 2 m (for remote control of main frame)
J0661A	RS-232C straight cable [D-Sub 9-pin (female) · D-Sub 25-pin (male)], 2 m (for remote control of main frame)
J0920B	Cross cable [D-Sub 9-pin (female) · D-Sub 25-pin (male)], 3 m (for remote control of main frame)
J0913A	Measurement cable [D-Sub 25-pin (male) · half pitch 36-pin], 2 m (for V.24/V.28)
J0914A	Measurement cable [V.35 connector (male) · half pitch 36-pin), 2 m (for V.35)

Model/Order No.	Name
J0915A	Measurement cable [D-Sub 37-pin (male) · half pitch 36-pin], 2 m (for V.36/RS-449)
J0916A	Measurement cable [D-Sub 15-pin (male) · half pitch 36-pin], 2 m (for X.20/X.21, using B terminal as ST1 output type)
J0945	Measurement cable [D-Sub 15-pin (male) · half pitch 36-pin], 2 m (for X.20/X.21, using B terminal as ST2 input type)
J0929	Cross measurement cable [D-Sub 15-pin (male) · half pitch 36-pin], 2 m (for X.20/X.21 MUX/DEMUX)
J0388B	DCE/DTE conversion adapter (D-Sub 25-pin, for V.24/V.28)
J0390	DCE/DTE conversion adapter (D-Sub 34-pin, for V.35)
J0392B	DCE/DTE conversion adapter (D-Sub 37-pin, for V.36/RS-449)
J0917A	TTL/CMOS connection box∗1 (I/O connector: BNC type)
J0923	Measurement cable (both-end Amphenol half pitch 36-pin), 1 m (for connection between MD6430A to TTL/CMOS)
J0463C	Measurement cable [both-end 8-pin modular (RJ45) with shield], 2 m (for 192k)
J0959B	Measurement cable (RJ45 8-pin modular · clip), 2 m (for 192K)
J0844A	ISO1073 cable [both-end 8-pin modular (ISO10173)], 2 m (for 1.5M, 2M)
J0127B	Coaxial cord (BNC-P · RG58A/U · BNC-P), 2 m (for 2M, 6M)
J0939	Coaxial cord (C-H3T type plug · BNC), 2 m (for 6M)
J0921B	Measurement cable [8-pin modular (ISO10173) · M-1PS], 2 m (for 1.5M, 2M)
J0922B	Measurement cable (mini-BANTAM · M-1PS), 2 m (for 64k, 2M CMI)
J0924B	Measurement cable (mini-BANTAM · I-214APS), 2 m (for external input clock, 64k + 8k)
J0930	Measurement cable (mini-BANTAM · M-3912), 2 m (for 64k, Siemens type)
J0960B	Measurement cable (mini-BANTAM · clip), 2 m (for 64k, 2M, CMI)
J0946A	Measurement cable [8-pin modular (ISO10173) · M-3912], 1 m (for 1.5M/2M)
J0946B	Measurement cable [8-pin modular (ISO10173) · M-3912], 2 m (for 1.5M/2M)
J0950	Measurement cable [8-pin modular (ISO10173) · clip], 2 m (for 1.5M/2M)
J0968	Balance cable (RJ45 · ISO10173), 2 m (for 192k)
J0969C	Unbalance cable [SP3CP/3CV-P (BNC)], 2 m (for 6M)
J0925B	Y cable (D-sub 25-pin · half pitch 36-pin/D-sub 25-pin), 2 m (for V.24/V.28 monitor)
J0926B	Y cable (D-sub 25-pin · half pitch 36-pin/D-sub 25-pin), 2 m (for V.35 monitor)
J0927B	Y cable (V.37 · half pitch 36-pin/D-sub 37), 2 m (for V.36/RS-449 monitor)
J0928B	Y cable (D-sub 15-pin · half pitch 36-pin/D-sub 15-pin), 2 m (for X.20/X.21 monitor)

∗1: Cable (J0923) required when using with TTL/CMOS interface
Note: For details of the measurement cable, refer to the Measurement Cable Selection Guide in the MD6430A Application Note.