

UDS-104

HIF50x

Unit Data Sheet

PART NUMBER/ MNEMONIC	NAME	STATUS
625626-000-001/ HIF501	High Speed Optical (OC3 Rate) Long Reach Interface Plug-in Unit with FC/PC optic connectors	MD. Replaced by 625626-000-003
625626-000-002/ HIF502	High Speed Optical (OC3 Rate) Long Reach Interface Plug-in Unit with SC optic connectors	MD. Replaced by 625626-000-004
625626-000-003/ HIF503	High Speed Optical (OC3 Rate) Long Reach Interface Plug-in Unit with FC/PC optic connectors	MD. Replaced by 3AL 02229 AC
3AL 02229 AC/ HIF503	High Speed Optical (OC3 Rate) Long Reach Interface Plug-in Unit with FC/PC optic connectors	Active
625626-000-004/ HIF504	High Speed Optical (OC3 Rate) Long Reach Interface Plug-in Unit with SC optic connectors	MD. Replaced by 3AL 02229 AD
3AL 02229 AD/ HIF504	High Speed Optical (OC3 Rate) Long Reach Interface Plug-in Unit with SC optic connectors	Active
3AL 02229 AE/ HIF505	High Speed Optical (OC3 Rate) Very Long Reach Interface Plug-in Unit with FC/PC optic connectors	Active
3AL 02229 AF/ HIF506	High Speed Optical (OC3 Rate) Very Long Reach Interface Plug-in Unit with SC optic connectors	Active

FEATURES AND APPLICATION NOTES

- Can work in conjunction with any of the VT/STS cross-connect plug-in units (VSCC101, VSCC20x, VSCC30x, or VSCC501).
- The HIF503, HIF504, HIF505, and HIF506 require release 04.02 or later 1603 SM

software.

- The HIF503 and HIF504 incorporate manufacturing improvements, which are software-dependent. Otherwise, the HIF503 and HIF504 are functionally identical to the HIF501 and HIF502.
- The HIF503 and HIF504 incorporate single mode, 1310-nm OC3 optics that supports Long Reach (LR) operation.
- The HIF505 and HIF506 are Very Long Reach (VLR) operation OC3 units.
- The 1603 SM can be equipped with up to four HIF50x plug-in units - two HIF50x units per high speed line group to provide redundant (A and B side) protection switching.
- Thermoelectric cooler not required on laser assembly.
- Modular PIN receiver with transimpedance amplifier.
- Supports Loss-of-Frame (LOF) integration timer (described in Telcordia's GR-253 as optional timer).
- Front panel mounted FC/PC optic connectors (HIF501 and HIF503) or SC optic connectors (HIF502 and HIF504) for both transmit (out) and receive (in) cabling.
- Provides front panel mounted, multicolored LED indicators:
 - Red LED for Unit Equipment Failure
 - Yellow LED for Facility Failure
 - Green LED for Unit Active (i.e., carrying active traffic)

DESCRIPTION

The HIF503 and HIF504 are capable of operating at long reach (40 km) distances over the extended temperature range of -40°C to 85°C. The HIF503 has front panel mounted FC/PC optic connectors. The HIF504 has SC optic connectors on the front panel.

None of the HIF50x units require external cooling. The 1603 SM shelves can accommodate up to two HIF50x plug-in units for each of the two line groups.

The HIF50x plug-in units provide the optical interface between the customer's fiber transmission link and the 1603 SM system's cross-connect/drop module. Connection with the customer's fiber transmission link is made using front panel mounted optic connectors. The HIF50x has built-in 1310-nm fiber-optic transmitter (TX) and receiver (RX) assemblies that operate at the Synchronous Optical NETwork (SONET) Optical Carrier Level-3 (OC3) line rate of 155.52 Mb/s.

Figure 1 is a functional block diagram of the HIF50x. The HIF50x circuitry:

- Provides H1, H2, V1, and V2 pointer processing to convert the combined OC3 clock rate and pointer changes to system clock rate and H1, H2, V1, and V2 pointer changes.
- Terminates the section, line and Synchronous Transport Signal (STS) path overhead bytes in received OC3 signal for performance monitoring and facility switchover.
- Provides two redundant Serial Bus Interface (SBI) link interfaces for the section, line and STS path overhead byte mapping between the OC3 input/output and Network Element Processor (NEPxxx) plug-in unit.
- Generates section, line and STS path overhead bytes for the OC3 output signal.
- Generates proper alarm signals (AIS, RDI, RFI) for the data transmitted downstream or upstream, and reports incoming alarm signals to the NEPxxx plug-in unit.
- Provides communications between the HIF50x controller and the NEPxxx plug-in unit using SBI links.
- Provides the 8-kHz reference clock signals which are derived from the received (incoming) OC3 signal.

- Provides equipment and facility switchover.
- Provides the remote inventory function.
- Provides diagnostic and loopback functions.
- Provides visual (LED) alarm and status indications.

Figure 2 shows the HIF503 plug-in unit. The other units in the HIF50x series have a similar layout.

[Figure 1. HIF50x, 625626-000-00x/3AL 02229 Ax, Functional Block Diagram](#)

[Figure 2. HIF503, 3AL 02229 Ax, Plug-in Unit](#)

SPECIFICATIONS

Tables A and B list HIF50x performance specifications.

Table A. Optical SONET Interface: HIF50x - High Speed Interface (OC3)

CATEGORY	PARAMETER	CHARACTERISTICS
Transmit Parameters	Data Rate	155.52 Mb/s (OC3)
	Nominal Wavelength	1310 nm
	Frequency Tolerance	4.6 ppm
	Line Code	SONET, NRZ
	Jitter	Category II per GR-253
	Spectral Width	4.0 nm RMS, maximum (HIF501/502) 2.75 nm RMS, maximum (HIF503/504) <1 nm, maximum (HIF505/506)
	Output Power Range, Maximum to Minimum	Refer to Table B
	Optical Devices (Non-cooled)	FP-MLM* laser (HIF501-HIF504) DFB-SLM (HIF505/506)
	Fiber Type	Single-mode
	Physical Interface	FC/PC connectors (HIF501, HIF503, HIF505) SC connectors (HIF502, HIF504, HIF506)
Receive Parameters	Data Rate	155.52 Mb/s (OC3)
	Nominal Wavelength	1310 nm
	Frequency Tolerance	20 ppm
	Line Code	SONET, NRZ
	Dispersion Allowance	Refer to Table B
	Receive Sensitivity Range Overload to Sensitivity	Refer to Table B
	Optical Devices	PIN
	Fiber Type	Multimode (50 mm)
	Physical Interface	FC/PC connectors (HIF501, HIF503, HIF505) SC connectors (HIF502, HIF504, HIF506)

Operational Parameters	Protection	1+1, nested switching
	Switching Time	50 ms maximum after detection of fault
	Reframe Time	250 μ s maximum
* FP-MLM means Fabry-Perot Multi Longitudinal Mode. DFB-SLM means Distributed Feedback - Single Longitudinal Mode.		

Table B. Optic Budget: HIF50x (OC3)

PARAMETER	REPRESENTATIVE SYMBOL	GUARANTEED CHARACTERISTIC
Wavelength Range	λ_{min}	1280 nm
	λ_{max}	1335 nm
Transmitter Output (at connector) Extinction Ratio	P_{Tmax}	4.0 dBm (HIF501/502)0 dBm (HIF503/504)2.0 dBm (HIF505/506)
	P_{Tmin}	-4.5 dBm (HIF501/502)-5.0 dBm (HIF503/504)-3.0 dBm (HIF505/506)
	r_{emin}	10.0 dB
Receiver Sensitivity at 10E - 10 BER (at connector) with single mode fiber input)	P_{Rmin}	-33.0 dBm (HIF501/502)-35.0 dBm (HIF503/504)-35.0 dBm (HIF505/506)
Power Penalty (dispersion) at a dispersion of	P_O	1.0 dB
	D_{SR}	185 ps/nm, min spec (HIF501/502)270 ps/nm, min spec (HIF503/504)(HIF505/506)*
Maximum Receiver Input	P_{Rmax}	-7.0 dBm
Available System Gain (10E-10 BER)	G	27.5 dB (HIF501/502) 29.0 dB (HIF503/504) 31.0 dB (HIF505/506)
* Link distance is controlled by loss only.		

The HIF501, HIF502, HIF503, and HIF504 numbers (refer to Table B) are specified for use in Standard Operating Conditions (SOC) environments only and signify the minimum performance values based on the following criteria:

- Over temperature: 0°C to 50°C (32°F to 122°F) ambient
- Worst case voltage tolerances combination (5% each rail)
- End of life for system
- Tx optic connector loss = 0.7 dB (included in device spec)
- Rx optic connector loss = 0.0 dB (included in device spec)

The HIF505 and HIF506 numbers (Refer to Table B) are specified for minimum performance based on Extended Operating Conditions (EOC) and the following criteria:

- Over temperature: -40°C to 65°C ambient
- Worst case voltage tolerances combination (5% each rail)
- End of life for system
- Tx optic connector loss = 0.7 dB (included in device spec)
- Rx optic connector loss = 0.0 dB (included in device spec)

