**ADTRAN®**

HDSL4
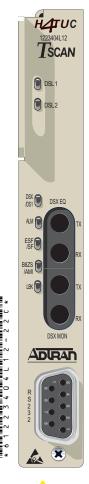# 3192M Transceiver Unit for the Central Office

**JOB**AID
61223404L12-22C
November 2013

**HDSL4**
## 3192M H4TU-C
P/N 1223404L12
CLEI: T1I3ADXA_ _

H4TUC
1223404L12
TSCAN

DSL1
DSL2

DSX /DS1    DSX EQ
ALM                TX
ESF /SF          RX
B8ZS /AMI
LBK               TX
                        RX
DSX MON

ADTRAN

R S 2 3 2

## FRONT PANEL LED STATUS

| | | | |
|---|---|---|---|
| **DSL1/ DSL2** | ● Green | Loop 1/ Loop 2 synchronization achieved and signal is present. No errors currently detected, and SNR margin ≥ 3 dB | |
| | ● Red | Loop 1/ Loop 2 synchronization not achieved, in sync with errors, or SNR margin < 3 dB | |
| **DSX/DS1** | ● Green | DSX/DS1 signal present and no errors currently detected | |
| | ● Red | In framed mode, denotes loss of framing or loss of sync at the DSX/DS1 input. In unframed mode, denotes loss of signal DSX/DS1 input | |
| **ALM** | ○ Off | No T1 alarms are active | |
| | ● Yellow | Loss of DS1 signal from the CPE | |
| | ● Red | Loss of DSX-1 signal from the network | |
| **ESF/SF** | ○ Off | Unit is provisioned for UNFRAMED data | |
| | ● Green | Unit is provisioned for SF data | |
| | ● Yellow | Unit is provisioned for ESF data | |
| **B8ZS/AMI** | ● Green | Unit is provisioned for AMI line code | |
| | ● Yellow | Unit is provisioned for B8ZS line code | |
| **LBK** | ○ Off | No local loopbacks active | |
| | ● Yellow | Local loopback active | |

## DSX EQ SPLITTING JACKS
**TX**  DSX-1 transmit toward the local loop (intrusive)
**RX**  DSX-1 receive from the local loop (intrusive)

## DSX MONITOR JACKS
**TX**  DSX-1 transmit toward the local loop (nonintrusive)
**RX**  DSX-1 receive from the local loop (nonintrusive)

## COMPLIANCE
This product is intended to be installed in restricted access areas only and in equipment with a type "B" or "E" enclosure.

| Code | Input | Output |
|---|---|---|
| Power Code | F | C |
| Telecommunication Code (TC) | – | X |
| Installation Code (IC) | A | – |

This product provides span powering voltage (negative only with respect to ground, –190 VDC nominal, GFI protection < 5 mA) and meets all requirements of Bellcore GR-1089-CORE (Class A2), ANSI T1.418-2002. This product is NRTL listed to the applicable UL standards.

***WARNING:*** ***Up to –200 VDC may be present on telecommunications wiring. The DSX-1 interface is intended for connection to intra-building wiring only. Ensure Chassis ground is properly connected.***

## POWERING MODE
The H4TU-C provides –190 VDC span powering voltage and will provide powering to the H4Rs and the H4TU-R. The –190 VDC span powering voltage is provided on Loop 2.

## DEFAULT PROVISIONING VALUES

| Provisioning Options | Settings | Default |
|---|---|---|
| DSX-1 Line Build Out | 0, 133, 266, 399, 533 | 0-133 feet |
| DSX-1 Line Code | AMI, B8ZS | B8ZS |
| DSX-1 Framing | SF, ESF, Unframed, Auto | ESF |
| Forced Frame Conversion | EN, DIS | DIS |
| Smartjack Loopback | EN, DIS | EN |
| Loopback Timeout | None, 120 minutes | 120 minutes |
| Latching Loopback Mode | T1 (Disabled), FT1 (Enabled) | T1 (Disabled) |
| DS1 Transmit Level | 0 dB, –7.5 dB, –15 dB | 0 dB |
| Span Power | EN, DIS | EN |
| Customer Loss Indicator | AIS. AIS/CI, Loopback | AIS/CI |
| PRM Setting | None, SPRM, NPRM, Auto | Auto |
| Loop Atten Alarm Threshold | O. Disabled 1-99. Alarm Threshold in dB | 34 dB |
| SNR Margin Alarm Threshold | O. Disabled 1-15. Alarm Threshold in dB | 4 dB |
| Remote Provisioning | EN, DIS | EN |
| Shelf Alarm | EN, DIS | EN |

## FEATURES

### Three-Repeater Support
The 3192M H4TU-C can span power three H4R repeaters when the H4TU-R remote unit is locally powered. Refer to the Installation and Maintenance Practice for details.

### TScan
The ADTRAN® 3192M H4TU-C incorporates the TScan™ feature. TScan allows for remote retrieval of circuit diagnostics and performs advanced fault location. For more information about TScan refer to the Installation and Maintenance practice.

### Bad Splice Detection
The Runtime TScan bad splice detection feature is an ADTRAN proprietary non-intrusive method for detection of anomalies (bad splices) in the copper plant. This feature non-intrusively monitors the cable pair during runtime for the presence of bad splices, which may potentially impact service. Poor splices in the cable are often undetected by normal testing methods. Often, these splices present no problem for the data transmission equipment until the point at which oxidation with the splice itself causes a rapid impedance change. Such a change in impedance may cause errors, signal margin fluctuation, and/or a retrain of the DSL transceivers. The splice detection feature is accessed from the Troubleshooting Screen via the craft access port.

### Fault Bridging
Fault Bridging minimizes downtime due to an intermittent impairment (GFI, short, micro-interruption, bad splice, noise burst, etc.) that appears on the cable pair. This allows the DSL transceivers to maintain synchronization during an interruption, thus avoiding a retrain. Depending on the impairment, interruptions as long in duration as 200 ms can be bridged.

### Fast Retrain
Fast Retrain is an ADTRAN proprietary feature that minimizes downtime due to an intermittent impairment which due to its duration cannot be bridged. When such impairments occur, the fast retrain feature will be invoked to restore service within 5 to 7 seconds, instead of the traditional 25 to 30 second retrain duration.

***NOTE:*** ***Fast-Retrain capable units must be installed on both ends of the circuit for this feature to function properly. Also, if there is a failure, for any reason, of a fast retrain attempt then the traditional (25-30 second) retrain will be initiated.***

For more information, refer to the Installation and Maintenance Practice (P/N 61223HDSL4L1-5) available online at www.adtran.com.

# ADTRAN®

## HDSL4
## 3192M Transceiver Unit for the Central Office

**PRICING AND AVAILABILITY** 800.827.0807
**TECH SUPPORT** 800.726.8663
**RETURN FOR REPAIR** 256.963.8722
www.adtran.com
61223404L12-22C

## TROUBLESHOOTING HDSL4

This ADTRAN HDSL4 unit is equipped with troubleshooting-at-a-glance LEDs (identified on the reverse side of this document) that provide customers with a simple means of identifying the location of certain faults. Additionally, screens available via the craft interface simplify the trouble isolation process. These screens and their associated benefits are described below.

*NOTE:* ***Upon connecting, it may be necessary to press the spacebar three times for the screen to display properly.***
*NOTE:* ***When the ADC HiGain® Management Unit (HMU) is installed, the 3192M DB-9 is disabled. Terminal screens must be accessed from any one of these HMUs:***
***HMU-319-L7A; HMU-319-L7AV307; HMU-319-L7A32.***

### Troubleshooting Screen

Available via the Main Menu: provides ADTRAN contact information and access to the Troubleshooting Guidance and General Information screens.

### Troubleshooting Guidance Screens

Available via the Troubleshooting screen: detects and displays errors and/or alarms at any of the monitored inputs (DSX1, DS1 and HDSL). Guidance on the fault(s) detected includes possible cause(s) and suggested actions, including those shown below:

**DSX-1/DS1:**

| | |
|---|---|
| LOS | Loss of signal (Red Alarm) at the DSX-1/DS1 receiver |
| CLK | T1 receive clock is out of range |
| RAI | Remote Alarm Indication (Yellow Alarm) detected at DSX-1/DS1 receiver |
| AIS | Alarm Indication Signal (Blue Alarm) detected at DSX-1/DS1 receiver |
| ERR | Errors recorded at DSX-1/DS1 receiver |

**Facility:**

| | |
|---|---|
| GROUND | Ground Fault on span (facility pair grounded) |
| SHORT | Short circuit (or low impedance) between pairs |
| OPEN | Open circuit between facility pairs |

**DSL:**

| | |
|---|---|
| LOS | Loss of HDSL sync |
| MARG | Margin has exceeded the alarm threshold |
| ATTEN | Attenuation has exceeded the alarm threshold |
| ERR | Errors recorded at the HDSL receiver |
| HIST | Performance History of the DSL units |

### General Information Screen

Available via the Troubleshooting screen: a reference page which displays the minimum acceptable signal margin, maximum attenuation, and other deployment parameters for this HDSL4 circuit.

*NOTE:* ***Along with the Troubleshooting screens, the Detailed Status screen and Performance History screen, available via the craft access terminal, provide both real-time and historical view of this circuit.***
*NOTE:* ***For complete deployment guidelines on the HDSL4 circuit, refer to the Installation and Maintenance Practice referenced on the front page.***

| ATTENUATION LIMITS | | |
|---|---|---|
| | **Recommended Maximum** | |
| | **Upstream** | **Downstream** |
| 1st segment | 30 dB | 32 dB |
| 2nd and 3rd segment | 28 dB | 28 dB |

| RANGE LIMITS, PIC Cable, 70°F | |
|---|---|
| | **Recommended Maximum** |
| 26 Gauge, 1st segment | 10,470 feet |
| 26 Gauge, 2nd and 3rd segment | 9,865 feet [1,2] |
| 24 Gauge, 1st segment | 14,770 feet |
| 24 Gauge, 2nd and 3rd segment | 14,050 feet [1,2] |

[1] In three segment circuits (two H4Rs), individual segment resistance values *must be verified*. Refer to the I&M Practice.

[2] When designing a dual H4R loop (three segment), the first segment should have lower DC resistance than the second segment.

## LOOPBACK CONTROL CODES

| Pattern | Description | Requires Arming? |
|---|---|---|
| 1in3 | Loop down all units and disarm | No |
| 2in5 | Arming Pattern, H4TU-R loops back if Smartjack LB is enabled | No |
| 3in5 | Disarm and loop down all units. Restores LB TMO after D5D6 | No |
| 2in6 | H4R1 LB to Network | No |
| 3in6 | H4R2 LB to Network | No |
| 4in6 | H4R1 LB to Customer | No |
| 5in6 | H4R2 LB to Customer | No |
| 3in7 | H4TU-R LB to Network | No |
| 4in7 | H4TU-C LB to Network | No |
| 5in7 | H4TU-R LB to Customer | No |
| 6in7 | H4TU-C LB to Customer | No |
| 3F1E | H4TU-C LB to Customer | No |
| 3F02 | H4TU-R LB to Customer | No |
| 3F04 | H4R1 LB to Customer | No |
| 3F06 | H4R2 LB to Customer | No |
| 3F08 | H4R3 LB to Customer | No |
| 6767 | Disable span powering while present | Yes |
| 9393 | Loop down H4TU-C, Repeaters – all loopbacks. Loop down H4TU-R – Cust LB always. Loops down H4TU-R – Network LB only if NIU is disabled. Does not disarm units if they are armed | No |
| C741 | H4R1 loop back pattern. 10 bit error injection | Yes |
| C742 | H4TU-R loop back pattern. 20 bit error injection | Yes |
| C754 | H4R2 loop back pattern. 200 bit error injection | Yes |
| C743 | H4R3 loop back pattern. 30 bit error injection | Yes |
| D3D3 | H4TU-C loop back pattern. 231 bit error injection | Yes |
| D5D5 | Query Loopback Pattern (error injection) H4TU-C: 231 Errors, H4R1: 10 Errors, H4R2: 200 Errors, H4R3: 30 errors; H4TU-R: 20 Errors | No |
| D5D6 | Loopback Timeout Override: Disables LB timeout. Restores original LB time-out when unit is disarmed | Yes |
| FF48 | FDL Arming Pattern (ESF only). Arms all units, H4TU-R loops back toward Network if NIU is set to Enabled (if pattern sources at network) | No |
| FF24 | FDL Disarm Pattern (ESF only). Loop down and disarm all units | No |
| FF1E | H4TU-C LB to Network. Does not loop back the H4TU-C if the H4TU-C is already in LB to Customer | No |
| FF02 | H4TU-R LB to Network. Does not loop back the H4TU-R if any unit is already in LB to Customer | No |
| FF04 | H4R1 LB to Network | No |
| FF06 | H4R2 LB to Network | No |
| FF08 | H4R3 LB to Network | No |

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