STS 3192–9P Short Loop Office Repeater

Complies with UL Standard 1459 Second Edition.

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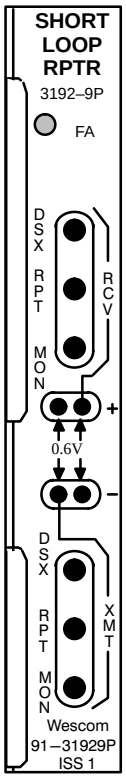


Figure 1. 3192–9P Short Loop Office Repeater

1. GENERAL

1.1 Document Purpose

This document provides general and testing information for the Charles Industries 3192–9P Short Loop Office Repeater, shown in Figure 1.

1.2 Document Status

This document is reprinted to provide a general editorial update.

1.3 Equipment Function

The 3192–9P is an optionless repeater intended for applications where T1 service is provided to a customer premise via a lightwave multiplexer and short non-repeated metallic extensions are provided beyond the normal DSX range. In this application, a STS shelf equipped with 3192–9P units is co-located with the fiber multiplexer providing up to 3000 foot repeaterless metallic extensions. The 3192–9P contains a –48 volt current regulator that provides simplex current at a constant 60mA to power a DS1 Connector located at the Network Interface. The 3192–9P cannot be used in T1 service applications where the Local Exchange Carrier provides network power to operate the customer's T1 CSU.

1.4 Equipment Features

- Provides a wide range ALBO (Automatic Line Build-Out) that will regenerate incoming signals that have experienced from 0 to 35dB of loss. No optionable padding of the incoming signal is required.
- Transformer-coupled passive transmit path with a fixed insertion loss of approximately 1.0dB.
- Provides a fault locate output. A resistive network on the secondary of the fault locate transformer provides the proper termination to the repeater when fault locate filters are not being deployed; eliminating the need to short the fault locate output when not in use.
- When the 3192–9P's internally-located fuse opens, the front-panel-mounted FA LED will illuminate and –48 volts will appear at the Fuse Alarm output (pin 10). The fuse will only open if the module is damaged and the fuse is not field replaceable.
- Front-panel-mounted bantam jacks that provide split and monitor access to the DSX.
- Front-panel-mounted pin jacks for measuring span current and voltage.
- Provides a fixed pre-equalization for up to 110 feet of 22 gauge cable or 90 feet of 24 gauge cable.

STATIC-SENSITIVE

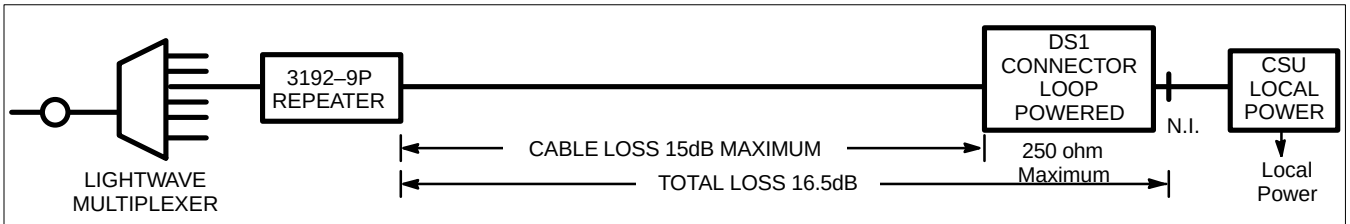
Units are shipped in static-protective material to protect static-sensitive devices. Use static-preventive measures for storage and handling.

DANGER

Potentially hazardous voltages can exist on carrier span lines. Always exercise caution when wiring a live circuit or when performing maintenance on the backplane of any span shelf.

Table 1. 3192–9P Front Panel Function Description

ITEM		FUNCTION
FA (Fuse alarm) Red LED		Indicates that the internal fuse on the 3192-9P has opened. The internal fuse is not field replaceable.
RCV Bantam Jacks	DSX	Isolates repeater allowing injection of signal toward the DSX.
	RPT	Isolates the DSX allowing monitoring of repeater RCV DSX (OUT).
	MON	Non-service-affecting RCV DSX (OUT) monitor jack.
Voltage and Current Test Pins		Used for measuring span current and voltage (see Testing).
XMT Bantam Jacks	DSX	Isolates the repeater allowing monitoring of signal from the DSX.
	RPT	Isolates the DSX allowing injection of signal toward the span.
	MON	Non-service-affecting XMT DSX (IN) monitor jack.



Note: Range is limited to maximum cable loss of 15.0db. See the table below for maximum cable length at various cable gauges.

Cable @ 130 F Aerial Pic	Maximum Length KF	Total DCR @ Maximum	Reference Loss dB/KF	Reference Loss OHMS/KF	Reference Maximum Loss
22 GA-CU	3.06 KF	56 OHMS	4.9 dB/KF	18.3 OHMS	15.0dB
24 GA-CU	2.46 KF	72 OHMS	6.1 dB/KF	29.2 OHMS	15.0dB
26 GA-CU	1.85 KF	85 OHMS	8.2 dB/KF	46.7 OHMS	15.0dB

Figure 1. 3192–9P Application Guidelines

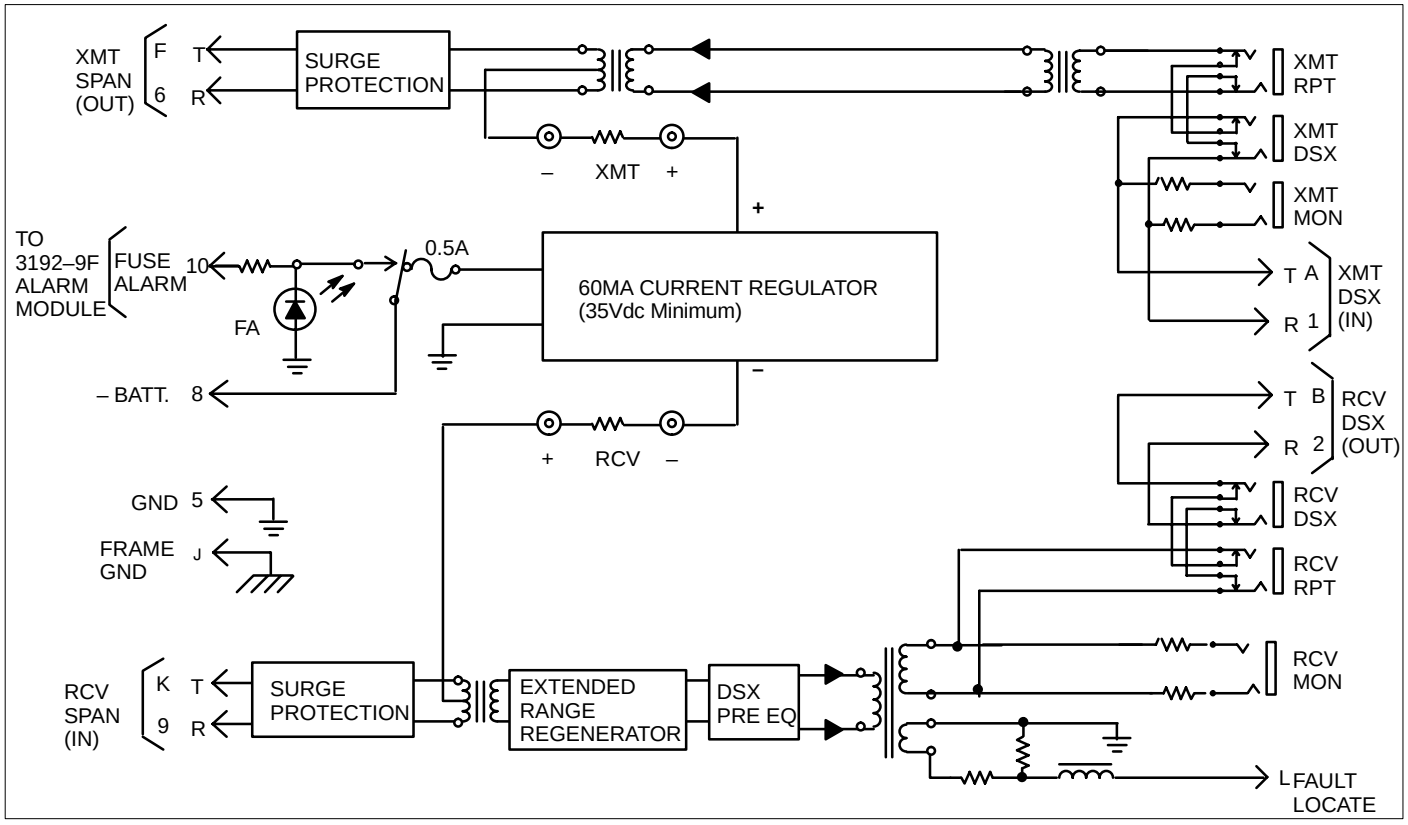


Figure 2. 3192–9P (Issue 1) Office Repeater Block Diagram

2. TESTING

If trouble is suspected with the 3192–9P Short Loop Office Repeater, use the following procedure to test the unit. This test is to be performed in service, with the 3192–9P under test and continuing to receive T1 signals from the metallic facility as well as the DSX. Also, the test can be performed out-of-service, in an appropriate test setup that would provide an equivalent T1 signal source.

Step	Action	Verification
1.	With a voltmeter, check for DC voltage between terminals 1 (–48V) & 3 (Gnd) and 2 (–48V) & 4 (Gnd) on terminal block TB–1. Verify span current and voltage at front panel test points.	Local battery voltage across terminals 1 & 3 and 2 & 3 of TB–1 should be between –42V and –56V. Verify span current; the DC voltage between the front panel test points should read 0.6 $\pm$ 0.03 Vdc. This corresponds to a span line current of 60mA $\pm$ 5 percent. Span voltage can be verified by connecting the negative lead of the voltmeter to the upper right (front panel) test point and the positive test lead to the lower left (front panel) test point.
2.	Check for the existence of the regenerated receive signal.	When checking with a T1 transmission test set, pulses should be observed. If not, replace the 3192–9P (see note).
3.	Check for signal error (bipolar violations) in the regenerated receive signal.	The error indicator on the T1 transmission test set should not light. If excessive errors are evident, replace the unit (see note).
4.	Verify the transmit signal on the span line.	A valid signal received from the DSX should be observed on the T1 transmission test set. Verify the wiring from the DSX. (This test assumes that the XMT from DSX signal input is a 3V (base to peak) 1.544mb/s T1 signal.)
Note:	*Before replacing the 3192–9P, verify that the distant end is sending a valid T1 signal.*	

3. TECHNICAL ASSISTANCE

3.1 Technical Assistance — U.S.

If technical assistance is required, contact Charles Industries' Technical Services Center at:

847–806–8500
847–806–8556 (FAX)
800–607–8500
techserv@charlesindustries.com (e-mail)

3.2 Technical Assistance — Canada

Canadian customers contact:

905–821–7673 (Main Office)
905–821–3280 (FAX)

4. WARRANTY & CUSTOMER SERVICE

4.1 Warranty

Charles Industries, Ltd. offers an industry-leading, 5-year warranty on products manufactured by Charles Industries. Contact your local Sales Representative at the address or telephone numbers below for warranty details. The warranty provisions are subject to change without notice. The terms and conditions applicable to any specific sale of product shall be defined in the resulting sales contract.

Charles Industries, Ltd.
5600 Apollo Drive
Rolling Meadows, Illinois 60008–4049

Telephone: 847–806–6300 (Main Office)
847–806–6231 (FAX)

4.2 Field Repairs (In-Warranty Units)

Field repairs involving the replacement of components within a unit are not recommended and may void the warranty and compatibility with any applicable regulatory or agency requirements. If a unit needs repair, contact Charles Industries, Ltd. for replacement or repair instructions, or follow the *Repair Service Procedure* below.

4.3 Advanced Replacement Service (In-Warranty Units)

Charles Industries, Ltd. offers an "advanced replacement" service if a replacement unit is required as soon as possible. With this service, the unit will be shipped in the fastest manner consistent with the urgency of the situation. In most cases, there are no charges for in-warranty repairs, except for the transportation charges of the unit and for a testing and handling charge for units returned with no trouble found. Upon receipt of the advanced replacement unit, return the out-of-service unit in the carton in which the replacement was shipped, using the preaddressed shipping label provided. Call your customer service representative at the telephone number above for more details.

4.4 Standard Repair and Replacement Service (Both In-Warranty and Out-Of-Warranty Units)

Charles Industries, Ltd. offers a standard repair or exchange service for units either in- or out-of-warranty. With this service, units may be shipped to Charles Industries for either repair and quality testing or exchanged for a replacement unit, as determined by Charles Industries. Follow the *Repair Service Procedure* below to return units and to secure a repair or replacement. A handling charge applies for equipment returned with no trouble found. To obtain more details of this service and a schedule of prices, contact the CI Service Center at 217–932–5288 (FAX 217–932–2943).

Repair Service Procedure

1. Prepare, complete, and enclose a purchase order in the box with the equipment to be returned.

2. Include the following information:

   – Company name and address
   – Contact name and phone number
   – Inventory of equipment being shipped
   – Particulars as to the nature of the failure
   – Return shipping address

3. Ship the equipment, purchase order, and above-listed information, transportation prepaid, to the service center address shown below.

   CI Service Center
   Route 40 East
   Casey, IL 62420–2054

4. Most repaired or replaced units will be returned within 30 or 45 days, depending on the product type and availability of repair parts. Repaired units are warranted for either 90 days from the date of repair or for the remaining unexpired portion of the original warranty, whichever is longer.

5. SPECIFICATIONS

5.1 Electrical

(a) OFFICE REPEATER TYPE: Passive transmit; regenerative receive.

(b) LINE SIGNAL TYPE: Bipolar at 1.544Mbps ±200bps.

(c) REPEATER LINE SIGNAL PULSE AMPLITUDE: 3V peak ±0.6V at DSX (6V peak-to-peak, pre-equalized).

(d) REPEATER LINE SIGNAL PULSE WIDTH: 324 ±45nsec.

(e) REPEATER LINE SIGNAL PULSE OVERSHOOT: 10 to 30 percent of pulse height, 20 percent nominal.

(f) REPEATER LINE SIGNAL PULSE RISE AND FALL TIME: 100nsec maximum.

(g) INPUT IMPEDANCE: 100 ohms nominal at 772kHz.

(h) RECEIVE LINE BUILD-OUT: Automatic, 0.0 to 35dB.

(i) SURGE PROTECTION: Input/output to ground, ±1000V; metallic, ±1000V.

(j) LINE CURRENT: 60mA ±5 percent.

(k) MAXIMUM CURRENT DRAIN: 65mA .

5.2 Physical

See Table 2 for the physical characteristics of the 3192–9P.

Table 2. Physical Specifications

Feature	U.S.	Metric
Height	4.75 inches	12.06 centimeters
Width	0.687 inches	1.746 centimeters
Depth	10.5 inches	26.67 centimeters
Weight	9 ounces	255 grams

Feature	U.S.	Metric
Temperature	–40 to 149°F	–40 to 65°C
Mounting	The 3192–9P ASPR Office Repeater is designed for use in the Charles Industries Span Termination System (STS) Mounting Shelves, or the 340 or 343 mountings. For additional information regarding the Span Termination System refer to **Section 319–211–100** (Span Termination System General Description) and **Section 319–211–200** (Span Termination System Installation and Application Engineering).