BCS II Simplex Repeater

User Manual

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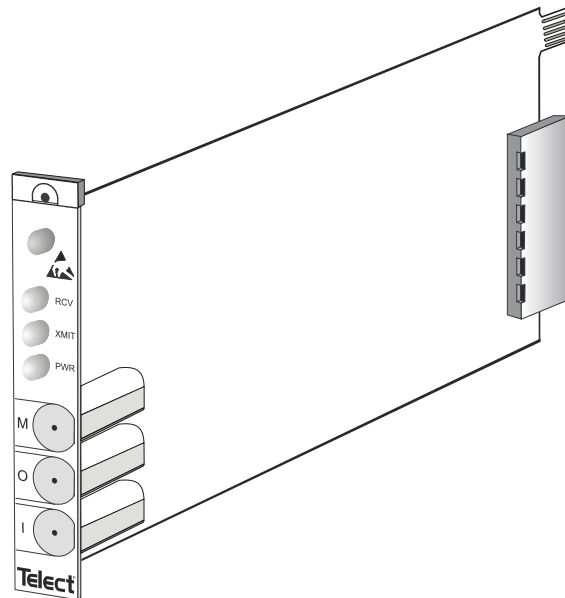
BCS II Simplex Repeater

User Manual, Part Number 117209

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About Telect

Telect offers complete solutions for physical layer connectivity, power, equipment housing and other network infrastructure equipment. From outside plant and central office to inside the home, Telect draws on more than 25 years of experience to deliver leading edge product and service solutions. Telect is committed to providing superior customer service and is capable of meeting the dynamic demands of customer and industry requirements. This commitment to customer and industry excellence has positioned Telect as a leading connectivity and power solution provider for the global communications industry.

Technical Support

E-mail: getinfo@telect.com

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BCS II Simplex Repeater

User Manual

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BCS II Simplex Repeater

User Manual

1.1 Description

The Broadband Connectivity System II (BCS II) Simplex Repeater (part # 710-3201-0002) regenerates DS3, E3, and STS-1 signals to allow increased separation of network elements and provides full DSX functionality. The module fits in any vertical BCS II chassis or in the Vector chassis and is always installed in pairs.

1.1.1 Features

- Full signal regeneration to equal level point on each circuit

- Mini-WECO monitor and I/O jacks

- Alarm and tracer lamp LEDs

- Full DSX functionality, including patching, monitoring and loopbacks

1.1.2 Specifications

1.1.2.1 Electrical

Monitor Level: 20 dB $\pm$ 1.5 dB below signal level

Return Loss: $\leq$ -24 dB at DS3 signal rate

Impedance: 75Ω (+/- 5%)

1.1.2.2 Power

Battery Input: A and B redundant, -42 to -58 Vdc

Input Current: 35 mA nominal @ 48V

Internal Fuse: 1/4 amp, not field replaceable

1.1.2.3 DS3 Input

Data Rate: 44.736 Mb/s $\pm$ 100 ppm

Data Format: Bipolar with B3ZS coding

Jitter Tolerance: Meets requirements of Telcordia GR-499-CORE, Issue 1, December, 1995

Equalization: Selectable normal or high sensitivity receive equalization, based on receive cable length

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1.1.2.4 DS3 Output

Data Rate: Same as input signal, transmit clock is recovered from input signal. Under AOS condition (no valid input): 44.736 Mb/s $\pm$ 100 ppm

Data Format: Bipolar with B3ZS coding, input bipolar violations are transparent to output.

Pulse Shape: Complies with Telcordia GR-499-CORE, Issue 1, December, 1995. Pulse plate complies with ANSI T1.404 pulse template.

LBO: Selectable DSX Level or DS3 High Output

1.1.2.5 E3 Input

Data Rate: 34.368 Mb/s $\pm$ 100 ppm

Data Format: AMI with HDB3 coding

Jitter Tolerance: Meets ITU-T G.832, 1993 requirements

Equalization: Selectable normal or high sensitivity receive equalization, based on receive cable length.

1.1.2.6 E3 Output

Data Rate: Same as input signal, transmit clock is recovered from input signal.

Data Format: AMI with HDB3 coding

Pulse Shape: Complies with ITU-T G.703

LBO: Fixed transmit level

1.1.2.7 STS-1 Input

Data Rate: 51.84 Mb/s $\pm$ 100 ppm

Data Format: Bipolar with B3ZS coding

Jitter Tolerance: Meets Telcordia GR-499-CORE, Issue 1, December, 1995 requirements

Equalization: Selectable normal or high sensitivity receive equalization, based on receive cable length.

1.1.2.8 STS-1 Output

Data Rate: Same as input signal, transmit clock is recovered from input signal.

Data Format: Bipolar with B3ZS coding

Pulse Shape: Complies with Telcordia GR-CORE-253

LBO: Selectable DSX Level or STS-1 High Output

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1.1.2.9 Alarms

Relay contacts rated for 2 amps maximum.

ALARM OUTPUTS, LEDs	CONDITION
RCV LED GREEN / XMIT LED GREEN / ALARM CONTACTS OPEN	NORMAL: VALID INPUT SIGNAL
RCV LED RED / XMIT LED AMBER / MAJ ALARM CONTACT CLOSED	LOSS OF VALID INPUT SIGNAL / ALL ONES SIGNAL AUTOMATICALLY TRANSMITTED
XMIT LED RED / MAJ ALARM CONTACT CLOSED	TRANSMITTER FAILURE
ALL FRONT PANEL LEDS OFF / PWR FAIL ALARM CONTACT CLOSED	FAILURE OF INTERNAL POWER CONVERTER OR LOSS OF BOTH BATTERY INPUTS

1.1.2.10 Environmental

Humidity: 95% relative humidity, noncondensing

Temperature: Operational from 0-50°C

Heat Dissipation: 5.7 BTUs/hour

1.1.2.11 Dimensions
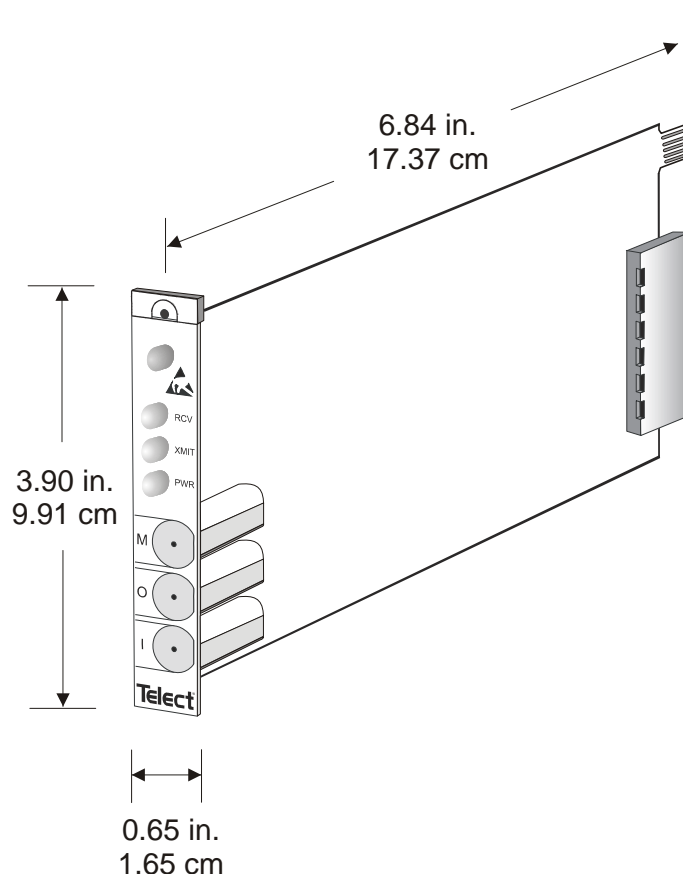
6.84 in.
17.37 cm

3.90 in.
9.91 cm

RCV

XMIT

PWR

M

O

I

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0.65 in.
1.65 cm

Figure 1 - Dimensions

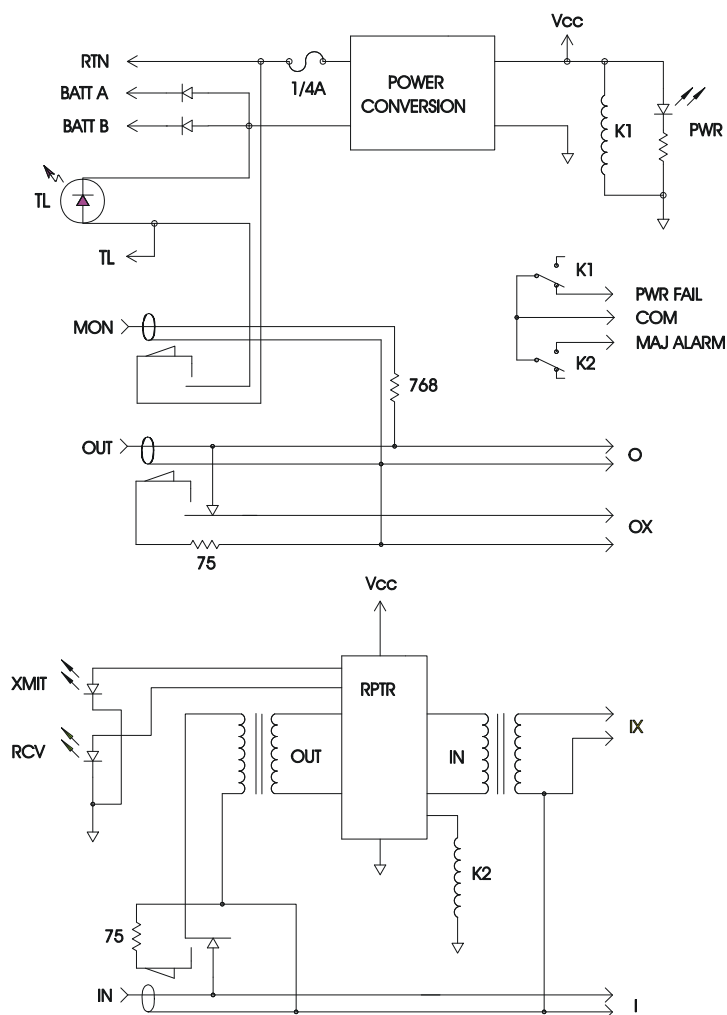Telect®

1.2 Schematic

Figure 2 - Schematic

1.3 System-Level Application

The simplex repeater regenerates DS3, E3, and STS-1 signals to equal level point over a distance of up to 900 ft (using RG-59/734 cable). **Two repeaters are required to regenerate both the send and receive signals and complete the cross-connect.**

The repeater regenerates the signal that appears on the IX port and transmits it out the I port for a length dependent upon the type of cable used. See Section "2.1 Installation" on page 6 to set the module jumpers based on cable length.

The OX and O ports are passive; therefore, a second repeater is required to regenerate and transmit the signal in the other direction. Each network element can be located up to 900 ft from the far-end repeater's IX port.
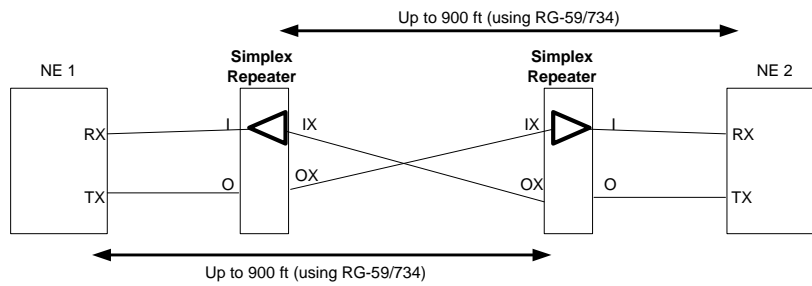
Figure 3 - Network Element Locations

2.1 Installation

2.1.1 Installation Considerations

⚠️ **CAUTION**

CAUTION! Only qualified technicians may install and maintain this product.

(!) **ALERT**

ALERT! These instructions presume you have verified that the Telect equipment being installed is compatible with the rest of the system, including power, ground, circuit protection, signal characteristics, equipment from other vendors, and local codes or ordinances.

♻️ ⚠️ (!) **ALERT**

ALERT! This repeater module contains static-sensitive components. To prevent equipment damage, wear a properly connected grounding strap while handling the module and store it in its original anti-static bag when not in use.

2.1.1.1 Location and Space

The BCS II Simplex Repeater module occupies one slot in any vertical BCS II chassis or in the Vector chassis. Do not install more than five repeater modules in a BCS II chassis. The Vector Chassis can be fully populated with repeaters. **You must install two repeaters to complete the cross-connect, one repeater for each network element.**

2.1.1.2 Tools and Equipment

No special tools or equipment are required. Wear a grounding strap during installation.

2.1.1.3 Power

–42 Vdc to –58 Vdc power reaches the module through the backplane connector on the chassis. Power to the backplane connector block is delivered from the power distribution panel using 16–22 AWG wire. See the chassis user manual for additional information on power transmission. Because the repeater is an active product, Telect recommends using a dual-feed power source.

2.1.1.4 Technical Support (USA)

By e-mail: getinfo@telect.com
By phone: 888-821-4856 or 509-921-6161

2.1.1.5 Inspection

Compare the contents of the shipping container with the packing list. Call Telect if you are missing anything.

NOTES:

Telect is not liable for shipping damage.

If the shipping container is damaged, keep it for the carrier's inspection. Notify the carrier and call Telect's Customer Service Department: 1-800-551-4567 or 1-509-926-6000.

Keep the container until you have checked equipment operation. If you experience any kind of problem, call Telect's Customer Service Department. Use the original, undamaged container if you are instructed to return the product to Telect.

2.2 Installing the Repeater

Procedure steps:

1. Identify the two network elements you wish to cross-connect.

2. Plan placement of the two repeater modules in relay racks, ensuring that

    – The distance between the network element and the repeater is correct for the system, cables in use and office procedures. This can be up to 450 feet.

    – The two repeater modules will not be more than 900 feet apart.

3. While wearing a grounding strap, remove the repeaters from their anti-static bags, touching the module edges only.

4. Set the jumpers on each module for the appropriate data rate, as shown below. (Factory setting is T3.)

5. Set the jumpers for the transmit and receive distances, as shown below. (Factory settings are Low and Short.) See the tables following to determine the settings appropriate for the type of cable being used.
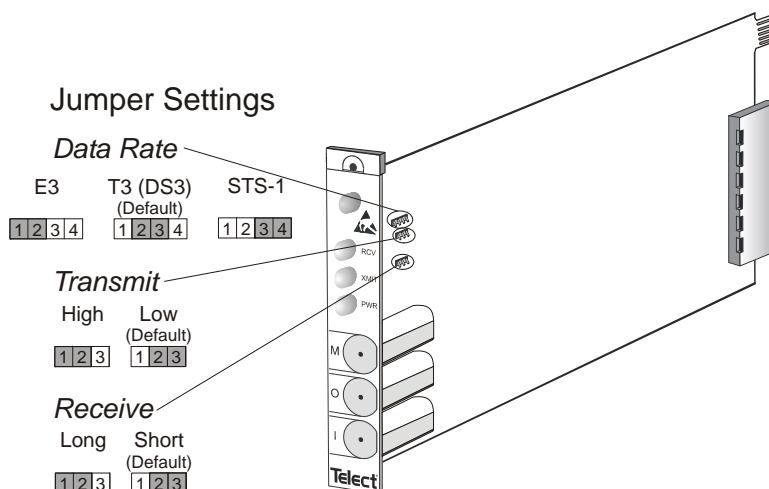

Figure 4 - Jumper Settings

NOTE: Transmit and Receive settings are for distance from repeater to network element (or next repeater) only.
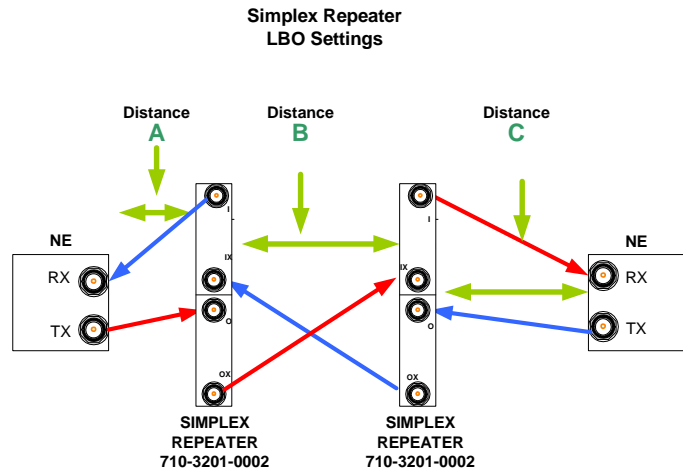
Table 1 - Transmit Settings by Cable Type

Cable	Repeater to NE distance (feet)	Setting
720	0-124	Low
	124-255	High
728	0-212	Low
	212-425	High
734	0-224	Low
	224-450	High
735	0-112	Low
	112-225	High
RG-59	0-224	Low
	224-450	High

Table 2 - Receive Settings by Cable Type

Cable	Cross-connect distance (feet)	Setting
720	0-124	Short
	124-255	Long
728	0-212	Short
	212-425	Long
734	0-224	Short
	224-450	Long
735	0-112	Short
	112-225	Long
RG-59	0-224	Short
	224-450	Long

6. Slide each module into the appropriate chassis slot and press it firmly into the backplane connector.

7. Secure each module with the included screw.

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8. Follow the diagram below to connect two network elements.

Simplex Repeater
LBO Settings

Each network element can be located up to 900ft. from the far end repeaters IX port.
(using RG-59/734)

CABLE	Repeater to NE distance (feet)	FIGURE Distance	Transmit LBO Setting	Repeater to Repeater distance (feet)	FIGURE Distance	Receive LBO Setting
720	0-124	A or C	SHORT	0-124	B	SHORT
	124-255	A or C	LONG	124-255	B	LONG
728	0-212	A or C	SHORT	0-212	B	SHORT
	212-425	A or C	LONG	212-425	B	LONG
734	0-224	A or C	SHORT	0-224	B	SHORT
	224-450	A or C	LONG	224-450	B	LONG
735	0-112	A or C	SHORT	0-112	B	SHORT
	112-225	A or C	LONG	112-225	B	LONG
RG-59	0-224	A or C	SHORT	0-224	B	SHORT
	224-450	A or C	LONG	224-450	B	LONG

Figure 5 - Connecting Two Network Elements

9. Install a backplane tracer lamp wire between the two repeaters and verify that both tracer lamp LEDs light up.

10. Install designation strips and label them, using office standards.

11. Test circuits per office standards.

This procedure is complete.

3.1 Operation

3.1.1 Monitoring

You can perform non-intrusive signal monitoring by connecting your test equipment to the front monitor jack (labeled M).
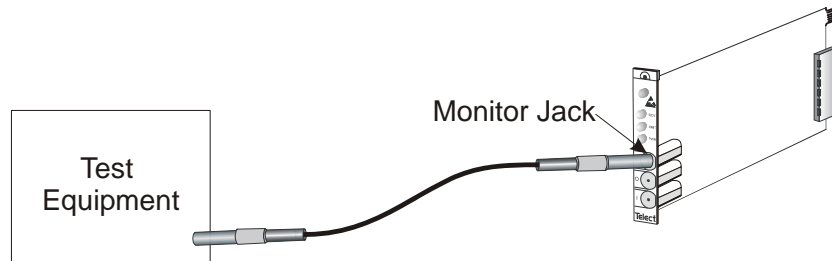

Figure 6 - Non-intrusive Signal Monitoring

3.1.2 Loopbacks

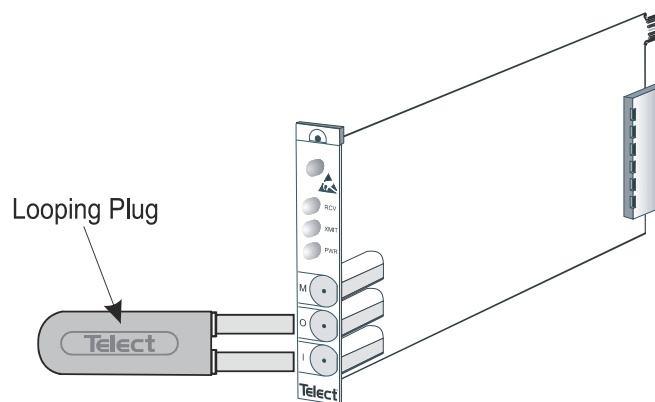To temporarily loop the repeater's OUT port to its IN port, fully insert a mini-WECO looping plug into the I/O jacks.

Figure 7 - Inserting a Mini-WECO Looping Plug

3.1.3 Patching

You can establish temporary patches using the I/O jacks on the front faceplate, as shown below. This operation is intrusive and will interrupt the cross-connect, routing the signals through the patch cords.
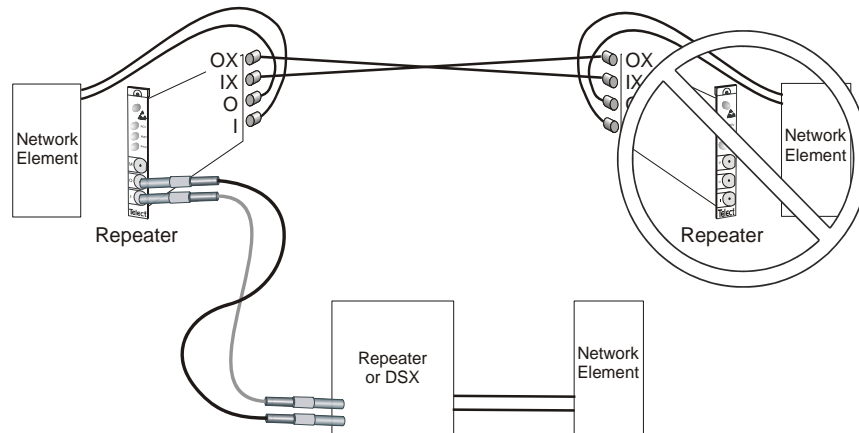

Figure 8 - Patching

4.1 Service

⚠ **CAUTION**

CAUTION! Only qualified technicians may install and maintain this product.

4.1.1 Owner Maintenance

Telect's BCS II Simplex Repeater module does not need preventive maintenance. The only part you can replace is the tracer lamp LED.

4.1.1.1 Replacing the Tracer Lamp LED

Procedure steps:

1. Pull the defective LED straight out with your fingers.

2. Align the replacement LED with the LED socket in the faceplate. Notice that the socket is keyed, and the LED enters only one way.

🚫 **ALERT**

ALERT! Do not bend the LED's two metal leads.

3. Gently insert the LED into the socket, as shown on the next page. If you encounter resistance, do not force the LED into position. Move it until it slides easily into the jack module.
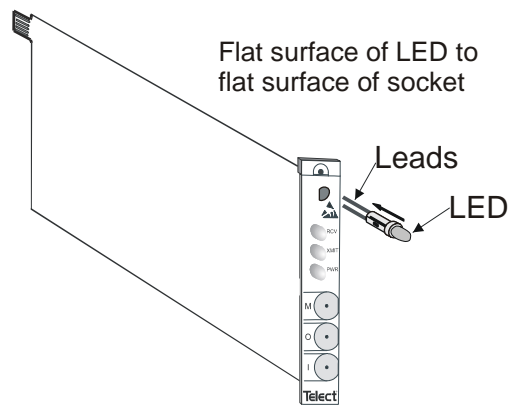
Figure 9 - Inserting the LED

4. When the LED snaps into place, the installation is complete.

5. To test the new LED, insert a plug into the "M" (monitor) jack.

    The LED flashes for about 30 seconds, then lights steadily.

This procedure is complete.

4.1.2 In Case Of Difficulty

If problems occur after initial installation, check all cable connections and the installation instructions in Chapter 2.

4.1.2.1 Technical Support

By e-mail: getinfo@telect.com
By phone: 888-821-4856 or 509-921-6161

4.1.3 In-Warranty Service

Contact your Telect equipment distributor, or call a Telect Customer Service Representative:

1-800-551-4567
1-509-926-6000

Telect will repair or replace defective products within the limits of the warranty. See "Repacking for Shipment" in this section.

NOTE: Call a Customer Service Representative for a Return Material Authorization (RMA) before returning any equipment.

4.1.4 Out-Of-Warranty Service

The procedure for out-of-warranty service is the same as for in-warranty service, except that Telect charges a processing fee, and you must submit a Purchase Order along with a Return

Material Authorization (RMA) before returning equipment. Call a Customer Service Representative for help getting these forms.

The processing fee guarantees a repair estimate and is credited against actual material and labor costs.

4.1.5 Repacking For Shipment

1. Tag the equipment with owner's name, address, and telephone number, together with a detailed description of the problem.

2. Use the original shipping container if possible. If you do not have it, package the equipment in a way to prevent shipping damage. Include the RMA inside the container and legibly print the RMA number on the outside of the package, near the shipping address.

3. Insure the package.

NOTE: Telect is not liable for shipping damage.

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