

# 3652-35 4W E&M/ER Installation Guide

CLEI™ Code: D4CEZF91AA

 Complies with Underwriters Laboratories Standard 1459 Second Edition\*

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## 1. GENERAL

### 1.1 Document Purpose

This document provides installation information for the Charles Industries 3652-35 4-Wire E&M with Extended Range (4W E&M/ER) Channel Unit.

### 1.2 Document Status

This document is reprinted to include a general editorial update.

### 1.3 Equipment Function

The Charles Industries 3652-35 4W E&M/ER Channel Unit is used in a Charles 360/363 D4 Channel Bank. The 3652-35 provides a direct interface between 600 ohm 4W E&M circuits and the 360/363 D4 Channel Bank common equipment. The 3652-35 Block Diagram is shown in Figure 1. Additional information, such as applications, circuit description, etc., is available in Section 365-235-201.

#### \*CAUTION

Field repairs/modifications may void compliance with Underwriters Laboratories Standard 1459 – 2nd Edition.

Compliance with Underwriters Laboratories Standard 1459 – Second Edition is restricted to inside plant wiring.

## 2. INSPECTION

### 2.1 Inspect for Damages

Inspect the equipment thoroughly upon delivery. If the equipment has been damaged in transit, immediately report the extent of damage to the transportation company.

### 2.2 Equipment Identification

Charles Industries' equipment is identified by a model and issue number imprinted on the front panel or located elsewhere on the equipment. Each time a major engineering design change is made on the equipment, the issue number is advanced by 1 and imprinted on subsequent units manufactured. Therefore, be sure to include both the model number and its issue number when making inquiries about the equipment.

### 2.3 Static Concerns

Each module is shipped in static-protective packaging to prevent electrostatic charges from damaging static-sensitive devices. Use approved static-preventive measures, such as static-conductive wrist straps and a static-dissipative mat, when handling modules outside of their protective packaging. A module intended for future use should be tested as soon as possible and returned to its original protective packaging for storage.



**This equipment contains static-sensitive electronic devices. To prevent electrostatic charges from damaging static-sensitive units:**

- Use approved static preventive measures (such as a static-conductive wrist strap and a static-dissipative mat) at all times whenever touching units outside of their original, shipped static-protective packaging.
- Do not ship or store units near strong electrostatic, electromagnetic, or magnetic fields.
- Use static-protective packaging for shipping or storage.

## 3. INSTALLER CONNECTIONS

Installer connections are made to the channel unit via connectorized cable connectors that are part of the channel bank assembly. Refer to the appropriate channel bank installer documentation for pin assignments.

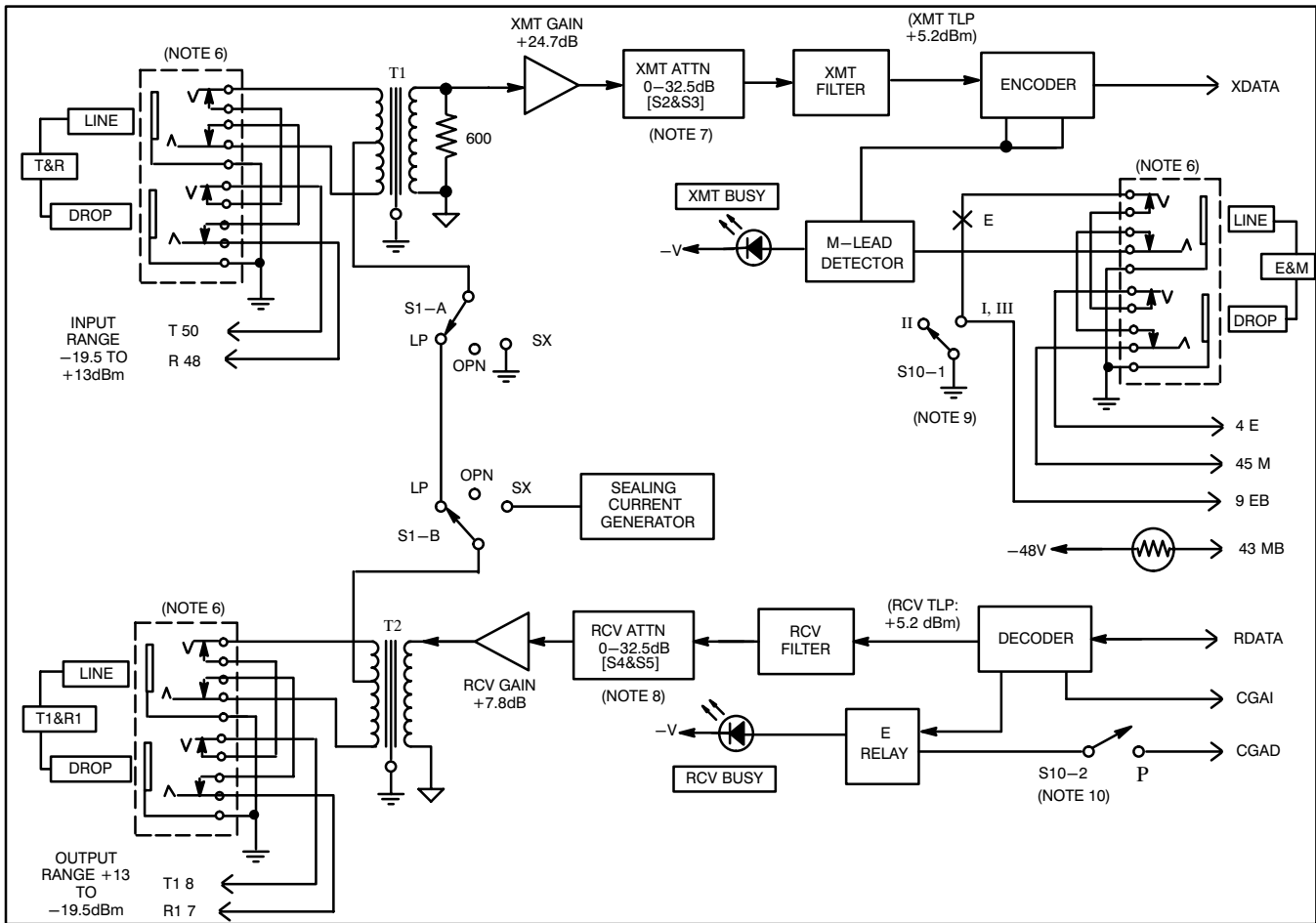


Figure 1. 3652-35 4W E&M/ER Channel Unit Block Diagram

Table 1. Notes for Figure 1

#	Note	#	Note																
1.	← PC board connector pin	7.	The XMT input range at T & R: -19.5DBM to +13DBM. The XMT ATTN provides from 0 to 32.5DB of attenuation in 0.1DB increments to accommodate various input TLPs. See below.																
2.	← Signal flow direction	<table border="1"> <thead> <tr> <th>INPUT (dBm)</th> <th>XMT ATTN SETTING</th> </tr> </thead> <tbody> <tr> <td>+13</td> <td>+32.5</td> </tr> <tr> <td>+7</td> <td>+26.5</td> </tr> <tr> <td>-16</td> <td>+3.5</td> </tr> </tbody> </table>		INPUT (dBm)	XMT ATTN SETTING	+13	+32.5	+7	+26.5	-16	+3.5								
INPUT (dBm)	XMT ATTN SETTING																		
+13	+32.5																		
+7	+26.5																		
-16	+3.5																		
3.	XXXX Front panel marking	8.	The RCV output range at T1 & R1 is +13.0 to -19.5DBM. The RCV ATTN provides from 0 to 32.5DB of attenuation in 0.1DB increments to accommodate various output TLPs. See below.																
4.	⊗ ⊕ N. O., N. C. relay contact	<table border="1"> <thead> <tr> <th>Marking</th> <th>Function</th> <th>OUTPUT (dBm)</th> <th>RCV ATTN SETTING</th> </tr> </thead> <tbody> <tr> <td>T&amp;R LINE</td> <td>Access toward channel unit</td> <td>+7</td> <td>+6</td> </tr> <tr> <td>T&amp;R DROP</td> <td>Access toward office equipment</td> <td>0</td> <td>+13</td> </tr> <tr> <td>E&amp;M LINE</td> <td>Access toward channel unit</td> <td>-16</td> <td>+29</td> </tr> </tbody> </table>		Marking	Function	OUTPUT (dBm)	RCV ATTN SETTING	T&R LINE	Access toward channel unit	+7	+6	T&R DROP	Access toward office equipment	0	+13	E&M LINE	Access toward channel unit	-16	+29
Marking	Function	OUTPUT (dBm)	RCV ATTN SETTING																
T&R LINE	Access toward channel unit	+7	+6																
T&R DROP	Access toward office equipment	0	+13																
E&M LINE	Access toward channel unit	-16	+29																
5.	Ganged switches are indicated by alphabetical suffixes. Numerical suffix denotes discrete switch within a package.	9.	M-Lead signaling: BUSY=-BATT; IDLE=GND/OPEN E-Lead signaling: BUSY=E Lead shorted to EB LEAD; IDLE=Open E-Lead																
6.	PC MOUNT TEST JACKS:	10.	Carrier Group Alarm option S10-2 (P).																
T1&R1 LINE	Access toward channel unit	(A) For a continuous idle during CGA, set S10-2 OFF. (B) For 2-sec. idle followed by continuous busy, for the duration of CGA, set S10-2 ON (P).																	
T1&R1 DROP	Access toward office equipment																		

### 4. OPTIONING INFORMATION

The 3652-35 is equipped with switch options that are used to condition the module for proper application and operation. Refer to Figure 2 for the location and description of these options.

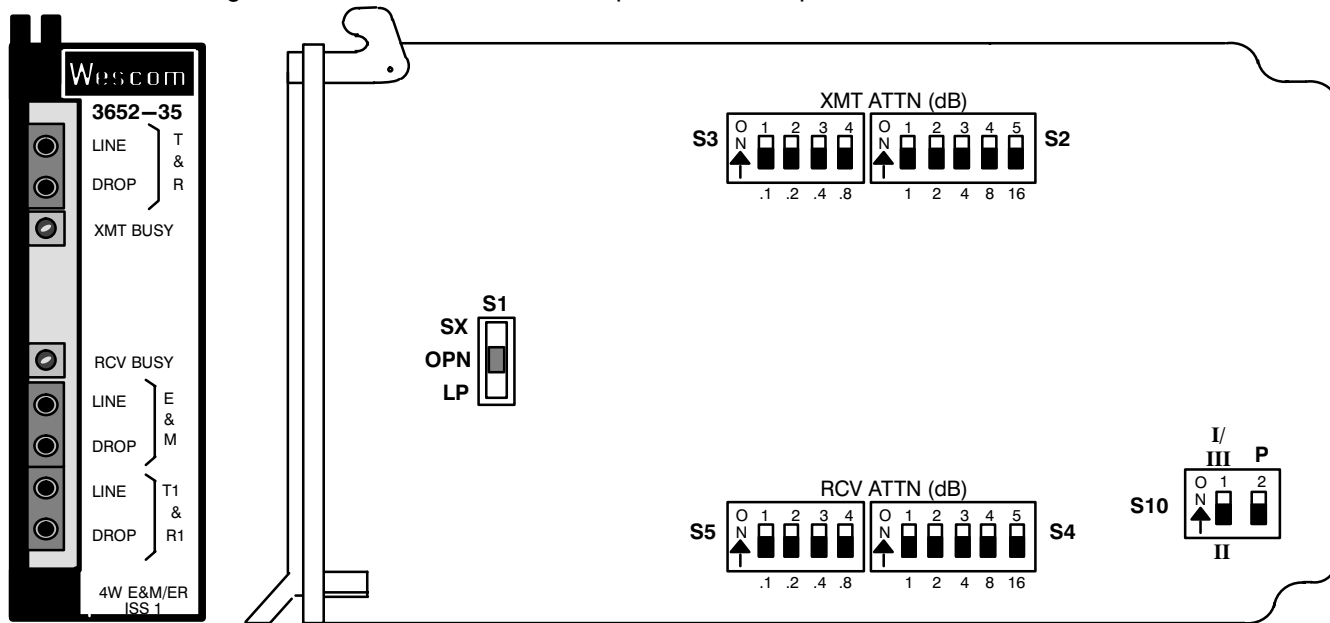
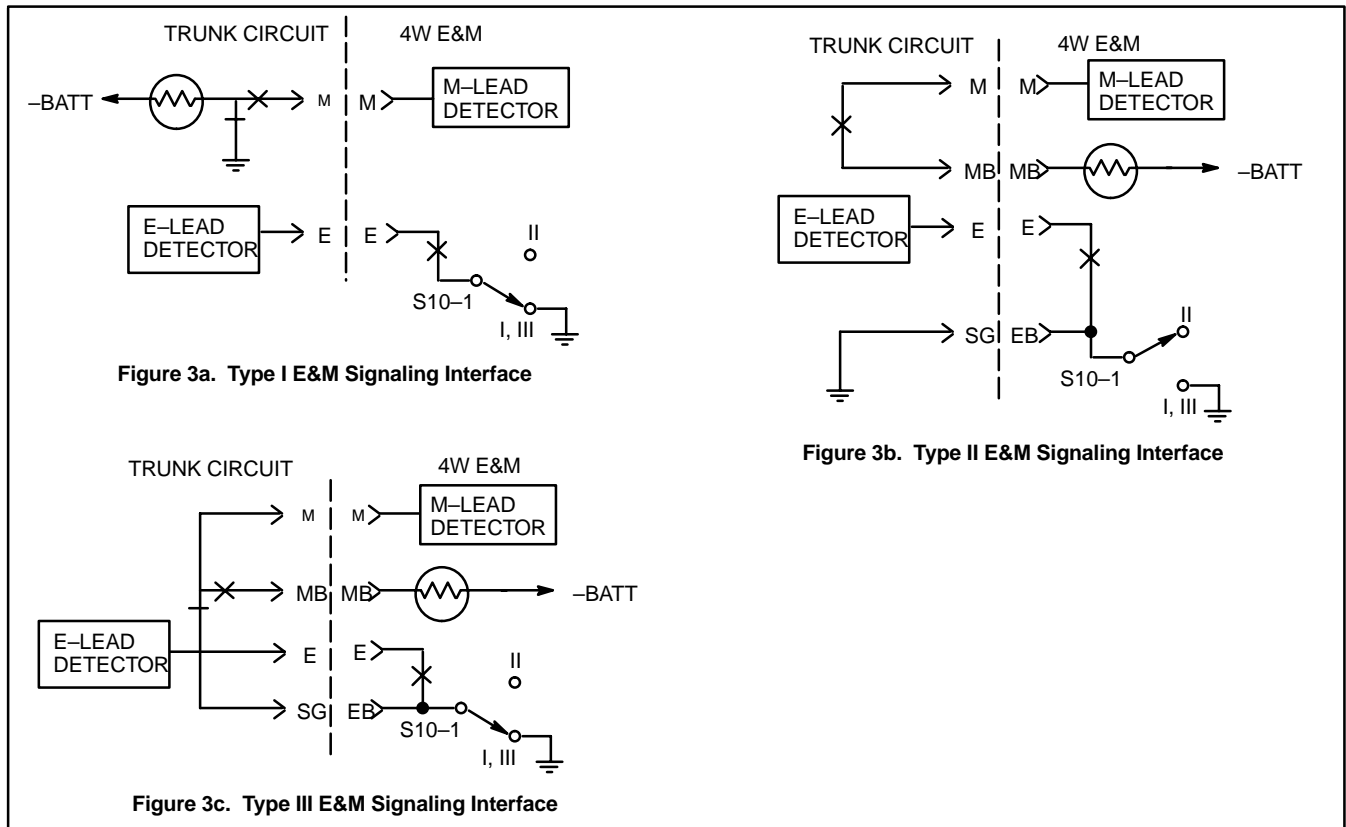


Figure 2. 3652–35 4W E&M/ER/LB Channel Unit Option Locations

Option	Function	Position
S1	Sealing current is generated by the channel unit with automatic ZAP when the module is first plugged in.	SX (Simplex)
	No sealing current is required.	OPN (Open)
	Sealing current supplied from the other end of the analog facility is looped by the channel unit via the simplex leads of transformers T1 and T2.	LP (Looping)
S2, S3 XMT ATTN	Switches S2 and S3 form a 9-section DIP switch that provides up to 32.5dB of attenuation, in 0.1dB steps, for adjusting the transmit path to the proper operating level at the ENCODER input.	ON/OFF as required. Refer to the Transmit Alignment Procedure
S4, S5 RCV ATTN	Switches S4 and S5 form a 9-section DIP switch that provides up to 32.5dB of attenuation, in 0.1dB steps, for adjusting the receive path to the proper operating level output at leads T1&R1.	ON/OFF as required. Refer to the Receive Alignment Procedure
S6 – S9	Not used.	_____
S10–1 I III/II	Provides Type I or Type III signaling interface (See Figure 3).	I/III
	Provides Type II signaling interface (See Figure 3).	II
S10–2 P	Provides continuous idle condition during CGA.	OFF
	Provides busy condition, after 2-second idle, during CGA.	ON (P)



**Figure 3. 3652–35 E&M Type I, II, and III Signaling Interface**

## 5. ALIGNMENT

### 5.1 Transmit Alignment

The XMT ATTN switches S2 and S3 are prescription controls that provide attenuation from 0.0 to 32.5dB in increments of 0.1dB to accommodate an input TLP range from  $-19.5$  to  $13.0$  dBm. To adjust the transmit path to the proper operating level, the difference between  $-19.5$  and the transmit TLP at T&R must be obtained:

$$\text{XMT ATTN} = \text{TLP} - (-19.5)$$

For an input TLP of  $-16$  dBm, the  $\text{XMT ATTN} = -16 - (-19.5) = 3.5$  dB. Set the sum of switches S2 and S3 settings to 3.5.

### 5.2 Receive Alignment

The RCV ATTN switches S4 and S5 are prescription controls that provide attenuation from 0.0 to 32.5 dB in increments of 0.1 dB to accommodate an output TLP range from  $+13.0$  to  $-19.5$  dBm. To adjust the receive path to the proper operating level, the difference between  $+13.0$  and the receive TLP at T1&R1 must be obtained:

$$\text{RCV ATTN} = 13.0 - \text{TLP}$$

For an output TLP of  $+7$  dBm, the  $\text{RCV ATTN} = +13 - (+7) = +6$  dB. Set the sum of switches S4 and S5 settings to 6.

## 6. MOUNTING

The 3652-35 mounts in one channel unit slot of a 360/363 D4 Channel Bank. The 3652-35 is equipped with an insert/eject lever in the form of a hinged front panel which ensures a positive connection of the channel unit's card-edge connector to the backplane connector when the unit is installed. The insert/eject lever also facilitates removal of the unit.

**CAUTION**

**Installation and removal of modules should be done with care. Do not force a module into place. If excessive resistance is encountered while installing a module, remove the module and check the card guides and connector to verify proper alignment and the absence of foreign material.**

Align the channel unit with the appropriate card-guided slot of the terminal. Slide the unit into the slot with the front panel in a horizontal (up) position. When the top portion of the hinged front panel is under the front lip of the terminal, push down on the front panel until it is in the vertical position. The channel unit's card-edge connector will begin to make contact with the inner portion of the backplane connector. Continue applying light pressure onto the bottom edge of the front panel until the unit snaps into place.

## **7. TESTING**

After completing optioning, installation, and alignment, place a call end-to-end through the facility to verify proper operation. If trouble is encountered, recheck all installer connections, options and alignment settings, and verify that the channel unit is making positive connection to the backplane connector. If trouble persists, replace the unit with a similar unit known to be in proper operating order and retest the facility. Channel unit testing for fault diagnosis or verification of circuit operation is provided in Section 360-001-205.

## **8. TECHNICAL ASSISTANCE**

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)

