

3652-66 4-Wire E&M with Extended Range Channel Unit

CONTENTS	PAGE
Part 1. GENERAL	1
Part 2. INSPECTION	1
Part 3. INSTALLER CONNECTIONS	2
Part 4. MOUNTING	2
Part 5. OPTIONING INFORMATION	2
Part 6. ALIGNMENT	5
Part 7. TESTING	6
Part 8. TECHNICAL ASSISTANCE	6

1. GENERAL

1.1 Document Purpose

This document provides installation instructions for the Charles Industries 3652-66 4-Wire E&M with Extended Range (4W E&M/ER) Channel Unit.

1.2 Document Status

This document is reprinted to correct a figure reference.

1.3 Equipment Function

The Charles Industries 3652-66 4-Wire E&M with Extended Range (4W E&M/ER) Channel Unit is designed to operate in a Charles 360/363 Channel Bank. The 3652-66 provides a 600-ohm balanced interface between the 360/363 D4 Channel Bank and the central office trunk circuits, tie lines and other switching equipment. See Figure 2 for the block diagram.

1.4 Equipment Location/Mounting

The 3652-66 mounts in one channel unit slot of a 360/363 D4 Digital Carrier Terminal.

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 unit 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 units outside of their protective packaging. A unit intended for future use should be tested as soon as possible and returned to its original protective packaging for storage.



STATIC-SENSITIVE

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

On connectorized 360/363 D4 Channel Banks (360-10, -11 etc.) connections are made via 25-pair female connectors (CINCH 222-22-50-023 or equivalent) to the appropriate 25-pair male connectors in the channel bank. Refer to section 360-000-200 for the wiring diagrams of the female connectors.

When installing a 3652-66 channel unit into a non-connectorized 360/363 D4 channel bank (00-suffixed), make the required connections as shown in Table 1.

Table 1. Installer Connections

Lead Designations		Pins
T	Tip-transmit	50
R	Ring-transmit	48
T1	Tip 1—receive	8
R1	Ring 1—receive	7
E	E-lead signaling — output to trunk	4
EB	E battery — Type II signaling	9
M	M-lead signaling — input from trunk	45
MB	M battery — type II signaling	43
1	Make busy lead 1	2
2	Make busy lead 2	6

Installer connections are made to the unit by wire-wrapping leads onto the associated 50-pin connectors on the backplane assembly of the 360/363 D4 channel bank.

4. MOUNTING

The 3652-66 is equipped with an insert/eject lever in the form of a hinged front panel which ensures a positive connection between the channel unit's card-edge connector and the backplane connector when the unit is installed. The lever facilitates removal of the unit.

5. OPTIONING INFORMATION

The 3652-66 is equipped with push-on jumpers, DIP switches and screw options to condition the module for proper application and operation. Refer to Figure 1 for the location and Table 2 for a brief summary of these options

Note: When opening a screw option, rotate the screw counterclockwise two full turns to insure that the connection is open. When closing a screw option, rotate the screw clockwise until it seats. When selecting a push-on jumper, push the jumper over the appropriate pins within that option's grouping to set the option.

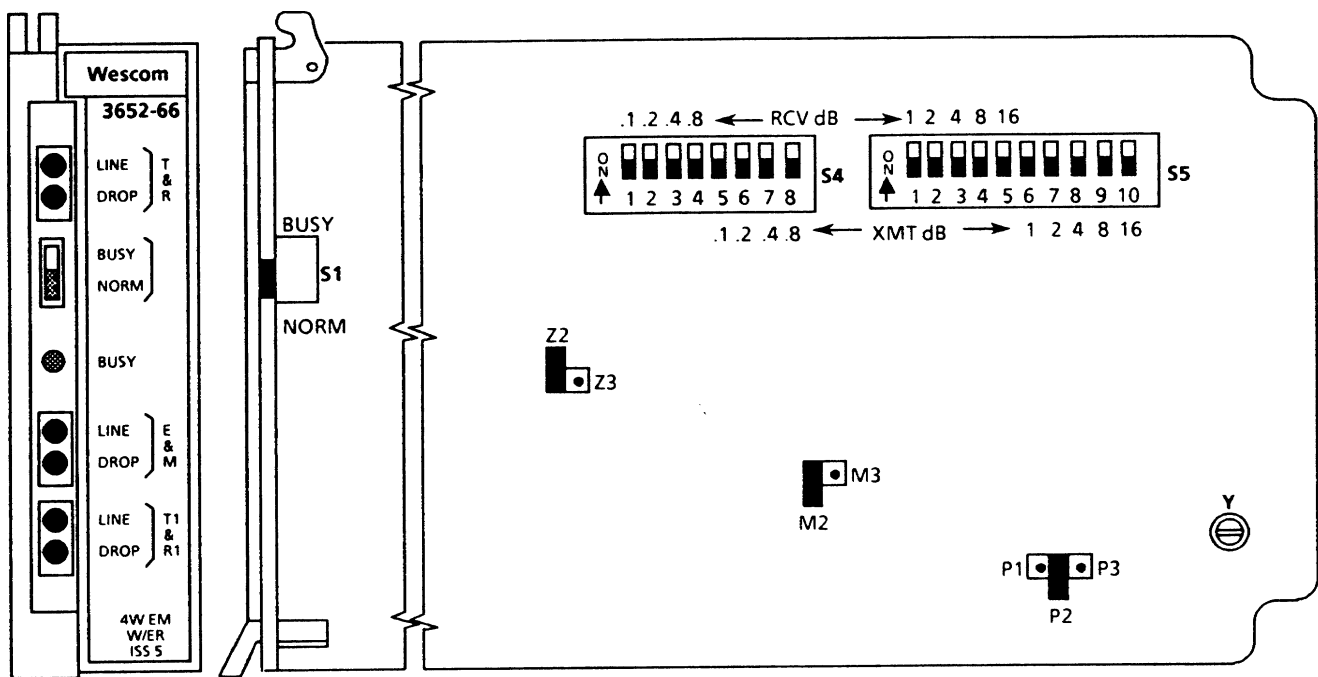


Figure 1. Option Locations

Table 2. Option Summary

Option	Type	Position	Function/Remarks
S1	2-position slide switch	NORM	Normal channel unit operation.
		BUSY	Busy-out channel unit for out-of-service testing.
S4	8-position slide switch	See Alignment	Provides up to 1.5 dB of gain to the transmit/receive path when all S4 switches are ON.
S5	10-position slide switch	See Alignment	Provides up to 32.5 dB of gain to the transmit/receive path when all S4 AND S5 switches are ON.
M	3-way push-on jumper (M1 not used)	M2	Sends a busy condition to the far end when S1 is set to BUSY.
		M3	Disables the busy condition to the far end when S1 is set to BUSY.
P	3-way push-on jumper	P1	Condition the E-lead to go idle, then busy after 2.5 seconds during a carrier failure.
		P2	Condition the E-lead to go busy during a carrier failure.
		P3	Condition the E-lead to go idle during a carrier failure.
Y	Screw option	OPEN	Provides contact closure between the 1- and 2-leads
		CLOSED	Provides switched ground output on the 1-lead and a ground on the 2-lead.
Z	3-way push-on jumper (Z1 not used)	Z2	E-lead condition for type I/III E&M signaling interface.
		Z3	E-lead condition for type II E&M signaling interface (E and EB dry contact). Busy E-lead: E and EB shorted Idle E-lead: E and EB open

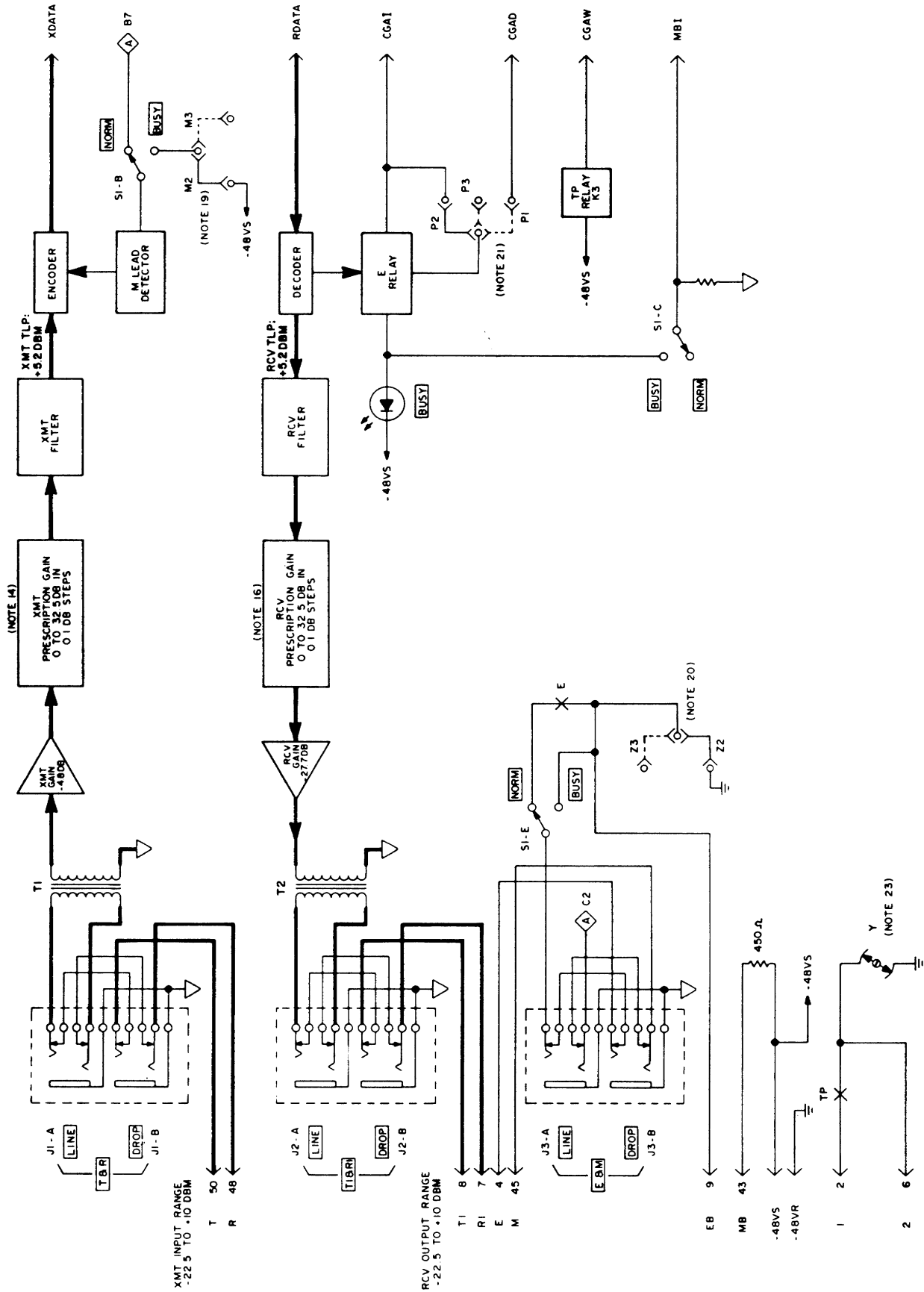


Figure 2. 3652-66 4W E&M w/ER Channel Unit Block Diagram

Table 3. Notes for the Block Diagram

1. PC BOARD CONNECTOR PIN
2. PRIMARY TRANSMISSION PATH
3. SIGNAL FLOW DIRECTION
4. FRONT PANEL MARKING
5. OPEN/CLOSED SCREW OPTION
6. FACTORY INSTALLED OPTIONAL STRAP
 ALTERNATE POSITION
7. RECEPTACLE TYPE OPTIONAL STRAP
 ALTERNATE POSITION
8. ALL LIKE-DESIGNATED POINTS ARE CONNECTED
9. N.O./N.C. RELAY CONTACT.
10. GANGED SWITCHES ARE INDICATED BY DASHED CONNECTION LINE OR ALPHABETICALLY SUFFIXED REF. DESIG.; NUMERICAL SUFFIX DENOTES DISCRETE SWITCH WITHIN A PACKAGE.
11. PC MOUNT TEST POINT
12. PC MOUNT TEST JACKS:

MARKING	FUNCTION
T & R LINE J1-A	ACCESS TOWARDS CHANNEL UNIT
T & R DROP J1-B	ACCESS TOWARDS OFFICE EQUIPMENT
T1 & R1 LINE J2-A	ACCESS TOWARDS CHANNEL UNIT
T1 & R1 DROP J2-B	ACCESS TOWARDS OFFICE EQUIPMENT
E & M LINE J3-A	ACCESS TOWARDS CHANNEL UNIT
E & M DROP J3-B	ACCESS TOWARDS OFFICE EQUIPMENT

13. THE XMT INPUT RANGE AT T & R : -22.5DBM TO +10DBM. THE UNIT IS FACTORY ADJUSTED FOR -16DBM INPUT WITH THE XMT GAIN SET TO 26DB.
14. THE XMT PRESCRIPTION CIRCUIT PROVIDES 32.5DB GAIN IN 0.1DB STEPS TO COMPENSATE FOR INPUT LEVEL VARIATIONS. REFER TO THE FOLLOWING TABLE FOR DETAILS:

INPUT (DBM)	+10	+7	0	-16	-22.5
XMT GAIN (DB)	0	3	10	26	32.5

15. THE RCV OUTPUT RANGE AT T1 & R1 : -22.5DBM TO +10DBM. THE UNIT IS FACTORY ADJUSTED FOR +70DBM OUTPUT WITH THE RCV GAIN SET TO 29.5DB.
16. THE RCV PRESCRIPTION CIRCUIT PROVIDES 32.5DB GAIN IN 0.1DB STEPS TO COMPENSATE FOR OUTPUT LEVEL VARIATIONS. REFER TO THE FOLLOWING TABLE FOR DETAILS:

OUTPUT (DBM)	+10	+7	0	-16	-22.5
RCV GAIN (DB)	32.5	29.5	22.5	6.5	0

17. BUSY SWITCH:
 SWITCH HANDLE DOWN IS NORMAL [NORM] POSITION.
 SWITCH HANDLE UP IS BUSY [BUSY] POSITION.
 BUSY SWITCH PERFORMS THE FOLLOWING FUNCTIONS:
 A. DISCONNECT THE E & M LEADS FROM THE OFFICE EQUIPMENT.
 B. TURN ON BUSY [BUSY] LAMP ON FRONT EDGE OF UNITS.
 C. APPLIES A BUSY CONDITION ON THE E LEAD TO THE OFFICE EQUIPMENT.
 D. SEND A BUSY CONDITION TO THE FAR END. THIS FUNCTION CAN BE DISABLED BY OPTION M.
 E. PROVIDE A MANUAL BUSY INDICATION TO THE ALARM AND LOGIC UNITS.
18. M LEAD CONDITION:
 THE M-LEAD WILL ACCEPT BATTERY FOR BUSY, GROUND OR OPEN FOR IDLE. THE MB LEAD (PIN 43) PROVIDES RESISTANCE BATTERY WHICH MAY BE RETURNED TO THE M-LEAD THRU AN OFFICE CONTACT FOR A TYPE II INTERFACE.
19. CONNECT OPTION M TO M2 WHEN USING THE BUSY SWITCH TO SEND A BUSY CONDITION TO THE FAR END IN THE NORM MODE. THIS FUNCTION IS DISABLED BY PUTTING M TO M3. M3 IS SELECTED WHEN PERFORMING SIGNALING TESTS ON A LOOPED CHANNEL BANK OR WHEN PERFORMING SINGLE CHANNEL MAINTENANCE ROUTINES ON AN OPERATING SYSTEM.
20. E LEAD CONDITIONS:
 BUSY: LEADS E & EB SHORTED
 IDLE: LEADS E & EB OPEN
 FOR TYPE I & III TRUNK CONNECT Z TO Z2 (EB GROUNDED)
 FOR TYPE II TRUNK CONNECT Z TO Z3 (E1 OR E2 AND EB DRY CONTACT)
21. OPTION P IS USED TO SELECT THE PROPER IDLE OUT/BUSY OUT SEQUENCE OF THE E LEADS WHEN CARRIER GROUP ALARM (CGA) IS ACTIVATED DUE TO AN ALARM CONDITION IN THE CHANNEL BANK.

E LEAD SEQUENCE	OPTION CONDITION
A. E LEAD IDLED OUT IMMEDIATELY UPON CGA.	CONNECT P TO P3
B. E LEAD BUSIED OUT IMMEDIATELY UPON CGA.	CONNECT P TO P2
C. E LEAD IDLED OUT IMMEDIATELY UPON CGA AND BUSIED OUT AFTER 2.5 SECONDS.	CONNECT P TO P1

22. WHEN THE CHANNEL UNIT IS REMOVED FROM ITS MOUNTING SLOT, THE E-LEAD (PIN 4) IS GROUNDED THRU A SHORTING CONTACT IN THE BACKPLANE CONNECTOR. A BUSY CONDITION IS TRANSMITTED TO THE FAR END E-LEAD.
23. TRUNK PROCESS RELAY IS ACTIVATED IMMEDIATELY DUE TO AN ALARM CONDITION IN THE CHANNEL BANK. TWO SECONDS LATER IT IS DEACTIVATED FOR 70 MILLI-SECONDS AND AGAIN ACTIVATED. DURING THE ACTIVATED MODE LEADS DESIGNATED AS 1 AND 2 ARE SHORTED:
 LEAD 2 GROUND: CLOSE Y
 LEAD 2 OPEN: OPEN Y
24. WHEN THE CHANNEL UNIT IS REMOVED FROM ITS MOUNTING SLOT, THE LEAD DESIGNATED "I" (PIN 2) IS GROUNDED THRU A SHORTING CONTACT IN THE CARD CONNECTOR.

6. ALIGNMENT

6.1 Transmit Alignment

The XMT prescription gain switches (half of S4 and half of S5) provide gain from 0.0 to 32.5 dB in increments of 0.1 dB to accommodate an input TLP range from +10.0 to -22.5 dBm. To adjust the transmit path to the proper operating level, the difference between +10.0 and the transmit TLP at T&R must be obtained. For example:

$$\text{For an input TLP of } -22.5 \text{ dBm } +10.0 - (-22.5) = 32.5 \text{ dB}$$

Se the sum of switches S4-5 through S4-8 and S5-6 through S5-10 to 32.5.

6.2 Receive Alignment

The RCV prescription gain switches (half of S4 and half of S5) provide gain from 0.0 to 32.5 dB in increments of 0.1 dB to accommodate an input TLP range from +10.0 to -22.5 dBm. To adjust the transmit path to the proper operating level, the difference between the receive TLP at T1&R1 and -22.5 must be obtained. For example:

$$\text{For an output TLP of } -16.0 \text{ dBm } -16.0 - (-22.5) = 6.5 \text{ dB}$$

Se the sum of switches S4-1 through S4-4 and S5-1 through S5-5 to 6.5.

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 a 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)

