

# **ADDENDUM**

## **BUS EXPANSION CARD FOR ADAM INTERCOM SYSTEM**

***RTS***<sup>TM</sup>

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Technical questions should be directed to:

Customer Service Department  
RTS/Telex,  
12000 Portland Avenue South  
Burnsville, MN 55337 U.S.A.  
Telephone: (952) 884-4051  
Fax: (800) 323-0498

## RETURN SHIPPING INSTRUCTIONS

### PROCEDURE FOR RETURNS

If a repair is necessary, contact the dealer where this unit was purchased.

If repair through the dealer is not possible, obtain a RETURN AUTHORIZATION from:

Customer Service Department  
Telex Communications, Inc.  
Telephone: (877) 863-4169  
Fax: (800) 323-0498

### **DO NOT RETURN ANY EQUIPMENT DIRECTLY TO THE FACTORY WITHOUT FIRST OBTAINING A RETURN AUTHORIZATION.**

Be prepared to provide the company name, address, phone number, a person to contact regarding the repair, the type and quantity of equipment, a description of the problem and the serial number(s).

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All shipments of RTS products should be made via United Parcel Service or the best available shipper, prepaid. The equipment should be shipped in the original packing carton; if that is not available, use any suitable container that is rigid and of adequate size. If a substitute container is used, the equipment should be wrapped in paper and surrounded with at least four inches of excelsior or similar shock-absorbing material. All shipments must be sent to the following address and must include the Return Authorization.

Factory Service Department  
Telex Communications, Incorporated  
8601 E. Cornhusker Hwy  
Lincoln, NE 68505 U.S.A.

Upon completion of any repair the equipment will be returned via United Parcel Service or specified shipper collect.

# INTRODUCTION

This document supplements the ADAM System Installation Guide, document number 9330-7467-000. It describes the usage of Bus Expansion (BX) cards with the intercom system.

## GENERAL DESCRIPTION

Bus Expansion (BX) cards permit interconnection of multiple ADAM frames to increase the size of an intercom system beyond a single frame. When a single ADAM frame is used in a stand-alone configuration, it provides up to 136 intercom ports, with 8 intercom ports being provided by each of the Audio I/O cards in the frame. Standard configurations for a single-frame intercom system are diagrammed in the ADAM-101 through ADAM-108 Drawings in the ADAM System Installation Guide.

To increase the intercom system size, Bus expansion (BX) cards are substituted for Audio I/O cards in selected card slots of each frame. Coax cables interconnect the BX cards to allow communication between the frames. Each frame requires a separate BX card to communicate with each of the other frames in the system. Table 1 shows the total number of ports provided, and the number of BX cards required as frames are added. Tables 2 through 6 on pages 6 through 8 summarize how the card slots are allocated for various sizes of intercom systems.

DIP switches on the BX cards specify the frame number where each BX card is used and also the total number of ADAM frames in the expanded intercom system. Settings for these DIP switches are summarized in Tables 7 and 8 on page 9. Additionally, there is a DIP switch on each BX card to enable/disable test audio. This feature allows the BX cards to perform certain self diagnostic functions that may help the system to recover if the communication path

is temporarily lost. The setting of this switch is described in the installation notes which follow.

In multi-frame systems, it is necessary to define one frame as the master frame (frame #1) and all other frames as slave frames. This is accomplished by DIP switch S1-7 on each Master Controller card. This DIP switch should be set to "on" for both Master Controller cards in the master frame. It should be set to the "off" position for all other Master Controller cards in all other frames.

The Master Controller cards also require different firmware, dependent on how many frames are being interconnected, and whether a card is intended for use in the master frame or a slave frame. To distinguish between cards with different firmware, a 3-digit suffix number is stamped on the card after the assembly part number (for example, Master Controller cards for the master frame in a 3-frame system will be stamped with assembly part number 9030-7514, and the suffix number will be -300). The various suffix numbers are indicated in Tables 2 through 6.

Each ADAM frame requires its own Master Controller Breakout Panel. The Master Controller Breakout Panel for frame #1 has a special function. It provides the connections for the configuration computer and any program assign panels or UIO-256 frames that are used by the intercom system. The Master Controller Breakout Panels for the remaining frames are then connected back to the primary Master Breakout Panel for Frame #1. Connections between the primary Master Controller Breakout Panel and the other Master Controller Breakout Panels are summarized in Table 9 on page 9.

For proper operation, the BX cards must be interconnected in a specific pattern. Card interconnections are summarized on page 5.

The general method of connecting Station Breakout Panels to all ADAM frames in an expanded system is the same as for a single-frame system. Typical connections of Station Breakout Panels are diagrammed in the ADAM-101 through ADAM-108 drawings in the ADAM System Installation Guide. However, note that the addition of BX cards causes some of the port numbers to shift to new slots. The port numbering information contained in Tables 2 through 6 in this addendum can be used to label the Station Breakout Panels in an expanded intercom system.

Once all components of the expanded intercom system are properly connected, operation is identical to a single-frame intercom system.

**Table 1.** Number of ADAM frames vs number of ports and number of BX cards per frame

Number of Frames	Total Intercom Ports	Number of BX Cards per Frame
1	136	0
2	256	1
3	360	2
4	448	3
5	520	4
6	576	5

## INSTALLATION NOTES

When installing Bus Expansion cards to create multi-frame ADAM Intercom systems, refer to the following notes as a supplement to the ADAM System Installation Guide.

### Notes to Paragraph 2 of the ADAM System Installation Guide: Mounting the Central Matrix Components

Label the ADAM Card Frames as “Frame 1”, “Frame 2”, etc. The numbering of the frames is completely arbitrary. However, the configuration computer must be connected to the Master Controller Breakout panel for whichever frame you designate as frame 1. If your intercom system uses a Trunking Master Controller, or Program Assign Panels, or UIO-256 Frames, these must also be connected to the Master Controller Breakout Panel for frame 1. Therefore, you should number the ADAM Card Frame which is closest to these devices as “Frame 1”.

### Notes to Paragraph 3 of the ADAM System Installation Guide: ADAM Circuit Cards

#### All Cards

Install all cards in the proper slots using the slot usage table that is appropriate for your intercom system (Tables 2 through 6 on pages 6 through 8). Be sure to read the following notes for each card type before installation.

#### Master Controller Cards, Suffix Numbers

Check the suffix number on each Master Controller card to make sure it is being installed in the correct frame. The suffix numbers are summarized in Tables 2 through 6 of this Addendum.

#### Master Controller Cards, Master vs Slave Frame Selection (S1-7)

In Frame #1, set DIP switch S1-7 on both Master Controller cards to the “on” position. For all other Master Controller cards in the remaining frames, make sure that DIP switch S1-7 is set to “off” (factory default setting).

#### BX Card DIP Switches (S6)

As you install each BX card, make sure that the S6 DIP switches are properly set:

- Set the frame number using Table 7, page 9.
- Set the total number of ADAM frames using Table 8, page 9. (All of the BX cards will have these switches set the same.)

- DIP switch S6-4 on each BX card is a test audio disable switch:

On (closed) disables test audio

Off (open) enables test audio

The test audio provides enhanced error correction for communication between the ADAM frames. When interconnecting more than two frames, always leave DIP switch S6-4 in the “Off” position on all BX cards. In a two-frame system, you can also set S6-4 to the “Off” position; however, you will not be able to use ports 125 through 128 of frame #1 and ports 253 through 256 on frame #2, since these ports must be used for the test audio.

- DIP switch S6-8 on the BX cards is not used, and the position does not matter.

### Notes to Paragraph 9 of the ADAM System Installation Guide: Connections to the ADAM Card Frame

#### Connections to Audio I/O Cards and Master Controller Cards

Connections to the AIO and MC cards for all frames are as shown in the ADAM-101 through ADAM-108 Drawings in the System Installation Guide. The only differences are that the slot numbers and port numbers for the Audio I/O cards will vary. (Use the slot numbers and port number shown in Tables 2 through 6 of this Addendum in place of the slot and port numbers shown in the ADAM-101 through ADAM-108 drawings.)

#### Master Controller Breakout Panel Interconnections

A connection is required from the Master Controller Breakout Panel of frame #1 to each of the other Master Controller Breakout Panels. Refer to Table 9, page 9. Use single-pair data cables for the connections (same type as is used to connect a PAP-950-50 as shown in the ADAM-809 Drawing in the System Installation Guide).

#### Configuration PC, Trunking Master Controller, UIO-256, PAP's

These devices should only be connected to ADAM frame #1. Connections are as shown in the ADAM-101 through ADAM-108 drawings in the System Installation Guide.

## Bus Expansion Card Interconnections

The Bus Expansion cards must be interconnected using coaxial cables. Use the following information when making the interconnections. Note that when interconnecting Bus Expansion cards, the “TX” jack (top jack) of the first card connects to the “RX” jack (bottom jack) of the second card and vice-versa.

### Interconnections for a 2-Frame System

Frame 1, slot 9 connects to Frame 2, slot 9

### Interconnections for a 3-Frame System

Frame 1, slot 9 connects to Frame 2, slot 9

Frame 1, slot 8 connects to Frame 3, slot 9

Frame 2, slot 8 connects to Frame 3, slot 8

### Interconnections for a 4-Frame System

Frame 1, slot 9 connects to Frame 2, slot 9

Frame 1, slot 8 connects to Frame 3, slot 9

Frame 1, slot 10 connects to Frame 4, slot 9

Frame 2, slot 10 connects to Frame 3, slot 8

Frame 2, slot 8 connects to Frame 4, slot 10

Frame 3, slot 10 connects to Frame 4, slot 8

### Interconnections for a 5-Frame System

Frame 1, slot 9 connects to Frame 2, slot 9

Frame 1, slot 8 connects to Frame 3, slot 9

Frame 1, slot 10 connects to Frame 4, slot 9

Frame 1, slot 7 connects to Frame 5, slot 9

Frame 2, slot 10 connects to Frame 3, slot 8

Frame 2, slot 8 connects to Frame 4, slot 10

Frame 2, slot 11 connects to Frame 5, slot 8

Frame 3, slot 10 connects to Frame 4, slot 8

Frame 3, slot 7 connects to Frame 5, slot 10

Frame 4, slot 11 connects to Frame 5, slot 7

## Interconnections for a 6-Frame System

Frame 1, slot 9 connects to Frame 2, slot 9

Frame 1, slot 8 connects to Frame 3, slot 9

Frame 1, slot 10 connects to Frame 4, slot 9

Frame 1, slot 7 connects to Frame 5, slot 9

Frame 1, slot 11 connects to Frame 6, slot 9

Frame 2, slot 10 connects to Frame 3, slot 8

Frame 2, slot 8 connects to Frame 4, slot 10

Frame 2, slot 11 connects to Frame 5, slot 8

Frame 2, slot 7 connects to Frame 6, slot 10

Frame 3, slot 10 connects to Frame 4, slot 8

Frame 3, slot 7 connects to Frame 5, slot 10

Frame 3, slot 11 connects to Frame 6, slot 8

Frame 4, slot 11 connects to Frame 5, slot 7

Frame 4, slot 7 connects to Frame 6, slot 11

Frame 5, slot 11 connects to Frame 6, slot 7

### Note

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This completes the additional procedures required when using Bus Expansion Cards. Intercom port connections for the additional ADAM frames are identical to what is described in the ADAM System Installation Guide. No operating procedures are affected.

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**Table 2.** Allocation of card slots for an intercom system with two ADAM frames. "BX" = Bus Expansion Card; "MC" = Master Controller Card (check for assembly part number 9030-7514 followed by the proper suffix number -200 as listed in this table); "1-8", "9-16" etc. = port numbers for Audio I/O Cards

Slots	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Frame #1	1-8	9-16	17-24	25-32	33-40	41-48	49-56	57-64	BX CARD	65-72	73-80	81-88	89-96	97-104	105-112	113-120	121-128	NOT USED	MC CARD -200	MC CARD -200
Frame #2	129-136	137-144	145-152	153-160	161-168	169-176	177-184	185-192	BX CARD	193-200	201-208	209-216	217-224	225-232	233-240	241-248	249-256	NOT USED	MC CARD -200	MC CARD -200

**Table 3.** Allocation of card slots for an intercom system with three ADAM frames. "BX" = Bus Expansion Card; "MC" = Master Controller Card (check for assembly part number 9030-7514 followed by the proper suffix number [-300 or -350] as listed in this table); ports "1-8", "9-16" etc. = Audio I/O Cards

Slots	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Frame #1	1-8	9-16	17-24	25-32	33-40	41-48	49-56	BX CARD	BX CARD	57-64	65-72	73-80	81-88	89-96	97-104	105-112	113-120	NOT USED	MC CARD -300	MC CARD -300
Frame #2	121-128	129-136	137-144	145-152	153-160	161-168	169-176	BX CARD	BX CARD	177-184	185-192	193-200	201-208	209-216	217-224	225-232	233-240	NOT USED	MC CARD -350	MC CARD -350
Frame #3	241-248	249-256	257-264	265-272	273-280	281-288	289-296	BX CARD	BX CARD	297-304	305-312	313-320	321-328	329-336	337-344	345-352	353-360	NOT USED	MC CARD -350	MC CARD -350

**Table 4.** Allocation of card slots for an intercom system with four ADAM frames. "BX" = Bus Expansion Card; "MC" = Master Controller Card (check for assembly part number 9030-7514 followed by the proper suffix number [-400 or -450] as listed in this table); ports "1-8", "9-16" etc. = Audio I/O Cards

Slots	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Frame #1	1-8	9-16	17-24	25-32	33-40	41-48	49-56	BX CARD	BX CARD	BX CARD	57-64	65-72	73-80	81-88	89-96	97-104	105-112	NOT USED	MC CARD -400	MC CARD -400
Frame #2	113-120	121-128	129-136	137-144	145-152	153-160	161-168	BX CARD	BX CARD	BX CARD	169-176	177-184	185-192	193-200	201-208	209-216	217-224	NOT USED	MC CARD -450	MC CARD -450
Frame #3	225-232	233-240	241-248	249-256	257-264	265-272	273-280	BX CARD	BX CARD	BX CARD	281-288	289-296	297-304	305-312	313-320	321-328	329-336	NOT USED	MC CARD -450	MC CARD -450
Frame #4	337-344	345-352	353-360	361-368	369-376	377-384	385-392	BX CARD	BX CARD	BX CARD	393-400	401-408	409-416	417-424	425-432	433-440	441-448	NOT USED	MC CARD -450	MC CARD -450

**Table 5.** Allocation of card slots for an intercom system with five ADAM frames. "BX" = Bus Expansion Card; "MC" = Master Controller Card (check for assembly part number 9030-7514 followed by the proper suffix number [-500 or -550] as listed in this table); ports "1-8", "9-16" etc. = Audio I/O Cards

Slots	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Frame #1	1-8	9-16	17-24	25-32	33-40	41-48	BX CARD	BX CARD	BX CARD	BX CARD	49-56	57-64	65-72	73-80	81-88	89-96	97-104	NOT USED	MC CARD -500	MC CARD -500
Frame #2	105-112	113-120	121-128	129-136	137-144	145-152	153-160	BX CARD	BX CARD	BX CARD	BX CARD	161-168	169-176	177-184	185-192	193-200	201-208	NOT USED	MC CARD -550	MC CARD -550
Frame #3	209-216	217-224	225-232	233-240	241-248	249-256	BX CARD	BX CARD	BX CARD	BX CARD	257-264	265-272	273-280	281-288	289-296	297-304	305-312	NOT USED	MC CARD -550	MC CARD -550
Frame #4	313-320	321-328	329-336	337-344	345-352	353-360	361-368	BX CARD	BX CARD	BX CARD	BX CARD	369-376	377-384	385-392	393-400	401-408	409-416	NOT USED	MC CARD -550	MC CARD -550
Frame #5	417-424	425-432	433-440	441-448	449-456	457-464	BX CARD	BX CARD	BX CARD	BX CARD	465-472	473-480	481-488	489-496	497-504	505-512	513-520	NOT USED	MC CARD -550	MC CARD -550

**Table 6.** Allocation of card slots for an intercom system with six ADAM frames. "BX" = Bus Expansion Card; "MC" = Master Controller Card (check for assembly part number 9030-7514 followed by the proper suffix number [-600 or -650] as listed in this table); ports "1-8", "9-16" etc. = Audio I/O Cards

Slots	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Frame #1	1-8	9-16	17-24	25-32	33-40	41-48	BX CARD	BX CARD	BX CARD	BX CARD	BX CARD	49-56	57-64	65-72	73-80	81-88	89-96	NOT USED	MC CARD -600	MC CARD -600
Frame #2	97-104	105-112	113-120	121-128	129-136	137-144	BX CARD	BX CARD	BX CARD	BX CARD	BX CARD	145-152	153-160	161-168	169-176	177-184	185-192	NOT USED	MC CARD -650	MC CARD -650
Frame #3	193-200	201-208	209-216	217-224	225-232	233-240	BX CARD	BX CARD	BX CARD	BX CARD	BX CARD	241-248	249-256	257-264	265-272	273-280	281-288	NOT USED	MC CARD -650	MC CARD -650
Frame #4	289-296	297-304	305-312	313-320	321-328	329-336	BX CARD	BX CARD	BX CARD	BX CARD	BX CARD	337-344	345-352	353-360	361-368	369-376	377-384	NOT USED	MC CARD -650	MC CARD -650
Frame #5	385-392	393-400	401-408	409-416	417-424	425-432	BX CARD	BX CARD	BX CARD	BX CARD	BX CARD	433-440	441-448	449-456	457-464	465-472	473-480	NOT USED	MC CARD -650	MC CARD -650
Frame #6	481-488	489-496	497-504	505-512	513-520	521-528	BX CARD	BX CARD	BX CARD	BX CARD	BX CARD	529-536	537-544	545-552	553-560	561-568	569-576	NOT USED	MC CARD -650	MC CARD -650



**Table 7.** Bus Expansion Card DIP switch S6 settings to select the frame number in which the card is used

Frame #	DIP Switch Settings: 0=off (open); 1=on (closed)		
	S6-1	S6-2	S6-3
1	0	0	0
2	1	0	0
3	0	1	0
4	1	1	0
5	0	0	1
6	1	0	1

**Table 8.** Bus Expansion Card DIP switch S6 settings to select the total number of ADAM frames and to enable/disable test audio

Number of ADAM Frames	DIP Switch Settings: 0=off (open); 1=on (closed)			
	S6-4* (Test Audio)	S6-5	S6-6	S6-7
2	1**	1	0	0
3	0	0	1	0
4	0	1	1	0
5	0	0	0	1
6	0	1	0	1

\* 0=enabled; 1=disabled

\*\* In a 2-frame system, test audio may be enabled by setting S6-4 to "0", but this will take over ports 125-128 of frame #1 and ports 253-256 of frame #2. These ports cannot then be used for intercommunication.

**Table 9.** Master Controller Breakout Panel interconnections

Connect from..	... to
Frame #1, J8	Frame #2, J8
Frame #1, J7	Frame #3, J8
Frame #1, J6	Frame #4, J8
Frame #1, J5	Frame #5, J8
Frame #1, J4	Frame #6, J8