L MULTIPLEX TERMINALS
COMMON EQUIPMENT
MASTERGROUP CONNECTOR J68829K (MMX-1 TO MMX-1)
OUT-OF-SERVICE TESTS

This section provides procedures for out-of-service tests of mastergroup connector J68829K (Section 356-026-100) and associated trunk circuits. Included are overall loss adjustment, cable equalizer adjustments, and pilot elimination tests which apply to regular and spare mastergroup connectors.

This section is reissued to expand the test procedure. Arrows are used to indicate significant changes. ***Equipment Test Lists are not affected.***

Mastergroup connector J68829K (Fig. 1) provides one transmission path for connecting a basic mastergroup signal (564 to 3084 kHz) from an MMX-1 receiving terminal to an MMX-1 transmitting terminal.

These tests may be conducted either to assure that a mastergroup connector is operating properly prior to placing in service or to check a suspected mastergroup connector that has been removed from service.

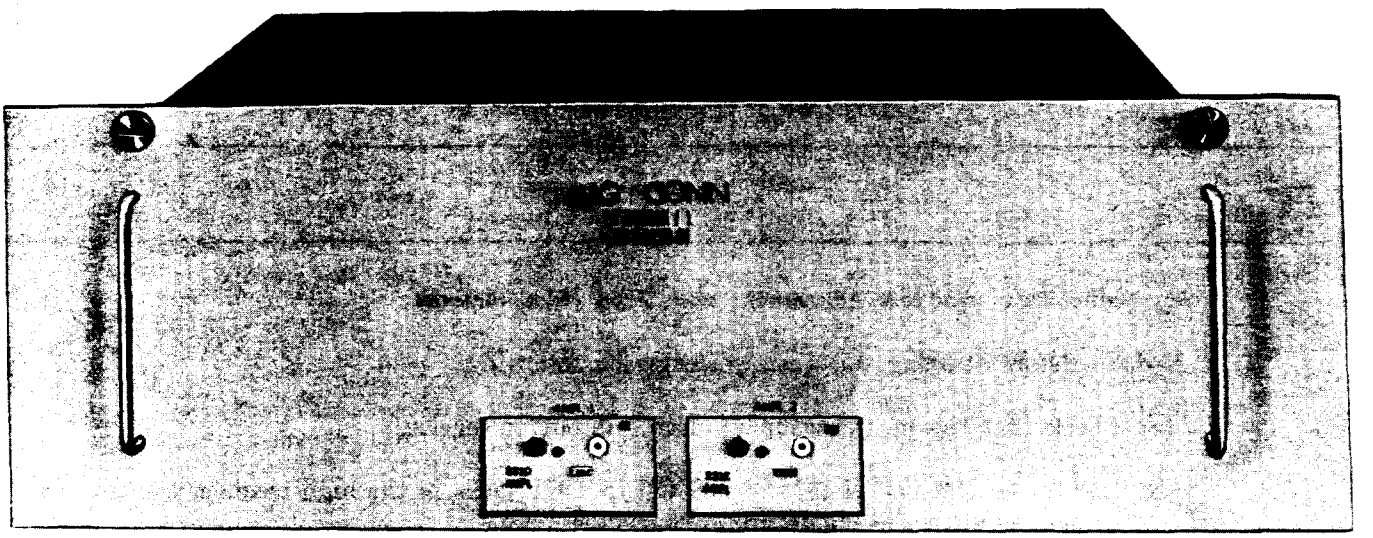

Fig. 1—Mastergroup Connector J68829K

APPARATUS:

The tests in this section require suitable transmission measuring equipment. Refer to Section 356-010-500 and select, from available equipment, sending and receiving units having the following capabilities:

Sending test equipment capable of delivering into 75-ohm circuits signals between 0.5 and 3.2 MHz at powers between -15 and -10 dBm

Receiving test equipment capable of detecting from 75-ohm circuits signals between 0.5 and 3.2 MHz at powers between -100 and -20 dBm.

Note: A frequency counter is required for the ***alternate*** method of performing the pilot elimination tests in this section.

CHART 1

MASTERGROUP CONNECTOR TESTS

STEP	PROCEDURE

A. Center-Frequency Loss Adjustment and Slope Measurements

Note: Before starting this test, perform the following:

(a) Check that the mastergroup connector is out of service.

(b) Locate the MG CONN IN and MG CONN OUT jacks in the high-frequency patch bay associated with the mastergroup connector.

(c) Locate the 210B cable equalizer associated with the mastergroup connector.

(d) Check that the mastergroup connector is equipped with the proper band-elimination filter according to the in-band pilot signals to be blocked.

CHART 1 (Cont)

STEP	PROCEDURE
	Loss Adjustment
1	Apply a 1.8-MHz test signal at -14 dBm to the MG CONN IN jack [patch (1), Fig. 2].
	Note: Remove the patch plug between this jack and the adjacent jack for the tests in this section.
2	Measure the 1.8-MHz power at the MG CONN OUT A jack [patch (2), Fig. 2].
	Note: Remove the patch plug between this jack and the adjacent jack.
	Requirement: -21.00 dBm ±0.25 dB
3	Proceed to Step 8 if the requirement is met. Otherwise, proceed to Step 4.
4	Adjust the attenuator and, if necessary, adjust the ADJ control on the 231D amplifier to meet the requirement.
	Note: The attenuator, located inside the mastergroup connector drawer, is adjustable from 0 to 10 dB in 0.5-dB steps.
5	Proceed to Step 8 if the requirement is met. Otherwise, proceed to Step 6.
6	Replace the 231D amplifier and, if necessary, replace the 231E amplifier in the mastergroup connector.

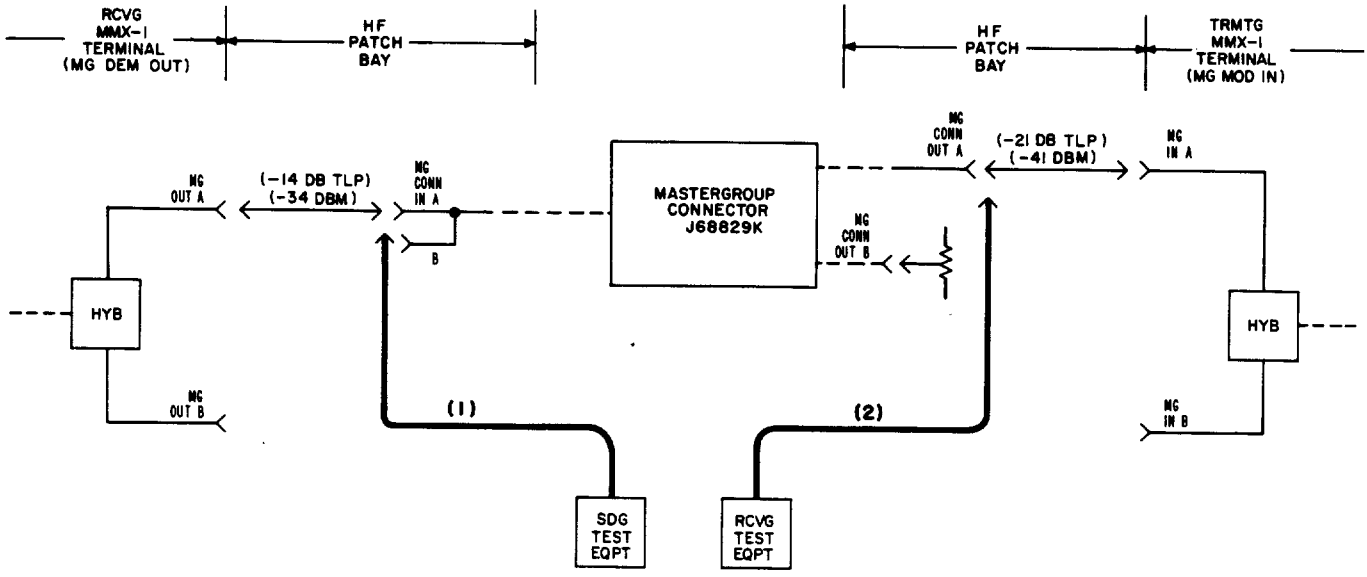

Fig. 2—Mastergroup Connector Test Connections

CHART 1 (Cont)

STEP	PROCEDURE
7	Repeat Steps 1 through 5.
	Slope Measurements
8	Repeat Steps 1 and 2 for test signals at 0.6 MHz and 3.0 MHz.
	Requirement: The 3.0-MHz signal power is within ±0.4 dB of the 0.6-MHz signal power.
9	Proceed to Part C to check the pilot elimination filter if the requirement is met. Otherwise, proceed to Part B to adjust the 210B cable equalizer associated with the mastergroup connector.
	B. Cable Equalizer Adjustments
10	Set the cable equalizer screw switches as indicated on the top line in Table A to provide 0.0-dB slope correction.
11	Apply a 0.6-MHz test signal at -14 dBm to the MG CONN IN jack.
12	Measure and record the 0.6-MHz power at the MG CONN OUT A jack.
13	Repeat Steps 11 and 12 for a 3.0-MHz test signal.
14	Determine the amount of slope correction required.
	Note: Slope correction equals the difference between the 0.6-MHz power and the 3.0-MHz power.
	Example:
	Power of 3.0-MHz signal = -22.3 dBm Power of 0.6-MHz signal = -20.7 dBm Difference = 1.6 dB
15	Set the 210B cable equalizer screw switches according to Table A to provide the slope correction required.
	Example:
	Slope correction required is 1.6 dB. Screws to be tightened down are 2 through 7, 9, 16, 19, 21, and 23.

TABLE A

210B EQUALIZER SETTING

SLOPE IN DB (0.5 TO 3.0 MHZ)	● INDICATES SCREWS TIGHTENED DOWN (ALL OTHERS WELL UP)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
0.0	●	●	●	●	●	●	●									●		●		●		●		
0.125		●	●	●	●	●	●		●							●		●		●		●		
0.250			●	●	●	●	●		●	●						●		●		●		●		
0.375				●	●	●	●		●	●	●					●		●		●		●		
0.50					●	●	●		●	●	●	●				●		●		●		●		
0.625						●	●		●	●	●	●	●			●		●		●		●		
0.75	●	●	●	●	●	●		●							●	●			●			●		
0.875		●	●	●	●	●		●	●						●	●			●			●		
1.0			●	●	●	●		●	●	●					●	●			●			●		
1.125				●	●	●		●	●	●	●				●	●			●			●		
1.25					●	●		●	●	●	●	●			●	●			●			●		
1.375						●		●	●	●	●	●	●		●	●			●			●		
1.50	●	●	●	●	●	●	●									●			●		●		●	
1.625		●	●	●	●	●	●		●							●			●		●		●	
1.75			●	●	●	●	●		●	●						●			●		●		●	
1.875				●	●	●	●		●	●	●					●			●		●		●	
2.0					●	●	●		●	●	●	●				●			●		●		●	
2.125						●	●		●	●	●	●	●			●			●		●		●	
2.25	●	●	●	●	●	●	●										●		●			●		●
2.375		●	●	●	●	●	●		●								●		●			●		●
2.50			●	●	●	●	●		●	●							●		●			●		●
2.625				●	●	●	●		●	●	●						●		●			●		●
2.75					●	●	●		●	●	●	●					●		●			●		●
2.875						●	●		●	●	●	●	●				●		●			●		●
3.0							●		●	●	●	●	●	●			●		●			●		●

Caution: Use a torque screwdriver for closing screw switches to ensure a good electrical contact. Tighten 5 to 7 inch-pounds for original 4-40 screws and 7 to 9 inch-pounds for replacement 5-40 screws.

CHART 1 (Cont)

STEP	PROCEDURE
16	♦Repeat the loss adjustment in Part A and then proceed to Part C to check the pilot elimination filter.♦

C. Pilot Elimination Tests

Pilot elimination filter options are provided in the mastergroup connector. Each mastergroup connector includes a 694A bandpass filter which passes the basic mastergroup band: 0.564 to 3:084 MHz. A mastergroup connector includes a 629B or a 629C band-elimination filter to block pilot signals or a 3.4-dB pad. The pad is included to simulate the filter loss when no pilot signals are blocked in the mastergroup connector.

Due to the narrow bandwidth of the pilot elimination filters, the test signals used must be at the correct frequencies to obtain valid results. Two methods are explained for these tests: the ***preferred*** method uses pilot signals obtained from a multiplex receiving terminal; the ***alternate*** method uses test signals from sending test equipment set to the exact frequency by means of a frequency counter.

17 Determine which pilot frequencies are blocked in the mastergroup connector by referring to Table B.

18 Proceed with the ***preferred*** method in Steps 19 through 22, if possible. Otherwise, proceed with the ***alternate*** method in Steps 23 through 25.

TABLE B

PILOTS BLOCKED IN MASTERGROUP CONNECTORS

MMX-1 TO MMX-1 TRANSMISSION PATH						
MASTERGROUP PASSED	FILTER INCLUDED	PILOTS BLOCKED (MHZ)	MINIMUM LOSS OF FILTER AT PILOT (DB)	MINIMUM LOSS BETWEEN MG OUT AND MG CONN OUT JACKS AT PILOT (DB)	MAXIMUM PILOT POWER AT MG CONN OUT (DBM)	
					PREFERRED METHOD	ALTERNATE METHOD
1	629B	0.556	44	51	—78	—54
		2.064	58	65	—92	—68
		3.096	50	57	—84	—60
3	629C	2.066*	58	65	—92	—68
		3.120	50	57	—84	—60
2	None	A 3.4-dB pad is included to simulate filter loss. There are no pilots in mastergroup 2.				

* Only the 3.120-MHz pilot is present in mastergroup 3 received from a TH microwave radio channel.

CHART 1 (Cont)

STEP	PROCEDURE
	Preferred Method
19	Measure and record the power of the appropriate pilot signals at an MG OUT B jack in the high-frequency patch bay. ***Note:*** The pilot frequencies are listed in Table B. The nominal power of the pilot signals at the MG OUT jacks is -34 dBm.
20	Connect the signals from this MG OUT B jack to the MG CONN IN jack of the mastergroup connector under test.
21	Measure and record the power of the pilot signals at the MG CONN OUT A jack. ***Requirement:*** A maximum power at each pilot frequency as listed in the PREFERRED METHOD column in Table B
22	Proceed to Step 25.
	Alternate Method
23	Apply a test signal at each of the appropriate pilot frequencies at -10 dBm to the MG CONN IN jack. ***Note:*** The pilot frequencies are listed in Table B. Use a frequency counter to obtain a test signal at the exact frequency.
24	Measure and record the power of each test signal at the MG CONN OUT A jack. ***Requirement:*** A maximum power at each pilot frequency as listed in the ALTERNATE METHOD column in Table B
25	Remove all test connections, replace all patch plugs removed, and restore the mastergroup connector circuit to normal.