

# MASTERGROUP CONNECTOR J68882AP (MMX-2 TO MMX-2)

## DESCRIPTION

### COMMON EQUIPMENT

#### ANALOG MULTIPLEX TERMINAL EQUIPMENT

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1.02 This section is reissued to correct errors, to expand the explanations, and to include a later photograph of the mastergroup connector (Fig. 1). Arrows are used to indicate significant changes.

1.03 For each direction of transmission the individual circuit includes an adjustable equalizer to compensate for various lengths of both input and output connecting trunks, a filter to suppress unwanted signals outside the basic mastergroup band, a filter to suppress the 2.840-MHz mastergroup pilot, and an adjustable amplifier.

#### 2. EQUIPMENT DESCRIPTION

2.01 The mastergroup connector (Fig. 1) is a shelf assembly designed for mounting in a standard 23-inch bay. The assembly measures approximately 4 inches high by 21.5 inches wide by 15 inches deep and weighs approximately 31 pounds. The main shelf assembly contains cable equalizers, input and output connections, and mounting facilities for the two plug-in modules that contain the active circuits for the two directions of transmission.

#### 1. GENERAL

1.01 The MMX-2 to MMX-2 mastergroup connector (SD-50720) contains two independent identical circuits for connecting basic mastergroup signals (564 to 3084 kHz) from the output of a receiving MMX-2 terminal to the input of a transmitting MMX-2 terminal.

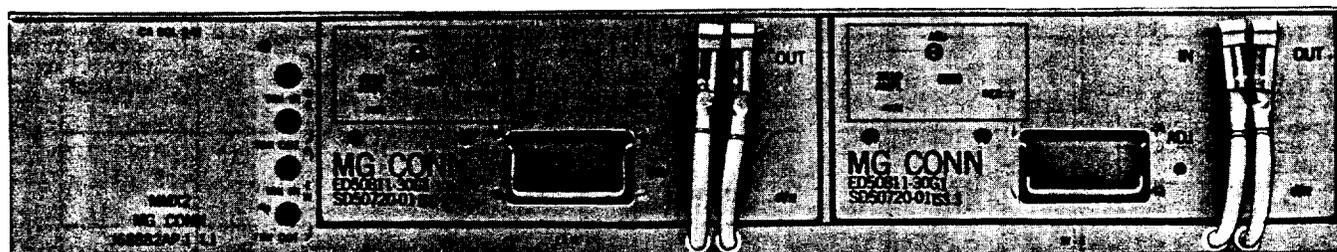


Fig. 1—Mastergroup Connector J68882AP

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2.02 E-W and W-E markings identify the two directions of transmission. Each plug-in module contains the apparatus for one direction of transmission. The apparatus (Fig. 2) includes a 778B bandpass filter, a 761A band-elimination filter, two 7-dB pads, a variable bridged-T attenuator, and a plug-in 231D amplifier.

2.03 Two 210B cable equalizers are mounted at the left side of the mastergroup connector. The cable equalizer for the E-W direction is located on the front panel, and the cable equalizer for the W-E direction is mounted directly behind. Access to the adjustment screws is via plates on the front and back, held in place by screws. The equalizers are adjusted at the time of installation to compensate for the combined length of cable in the input and output trunks. The 210B equalizer provides compensation for up to 1200 feet of 724-type coaxial cable and is adjustable in 50-foot steps.

2.04 The TRK OUT and TRK IN jacks permit patching in the active circuit module of a spare connector when it is necessary to remove a regular connector module from service.

3. CIRCUIT DESCRIPTION

3.01 Figure 2 is a block diagram of the MMX-2 to MMX-2 connector circuit for one direction of transmission. A like circuit is provided for the other direction of transmission. Functionally, the

circuit can be divided into an input circuit, a filter-amplifier circuit, and an output circuit.

A. Input Circuit

3.02 The basic mastergroup signal (0.564 to 3.084 MHz) from the receiving MMX-2 terminal is fed into the 210B cable equalizer. This equalizer provides slope equalization to compensate for various combined lengths of cable between trunk jacks in the receiving and transmitting MMX-2 bays. The hybrid following the equalizer splits the signal into two equal-level, in-phase outputs. One output is fed into the regular mastergroup connector filter-amplifier circuit. The other output appears at the normally terminated TRK OUT jack and is used for patching in a spare mastergroup connector to remove the regular connector from service.

B. Filter-Amplifier Circuit

3.03 In the filter-amplifier circuit, the signal flow is through a fixed 7-dB pad, a 778B bandpass filter, a second 7-dB pad, a 761A band-elimination filter, an adjustable bridged-T attenuator, and a 231D amplifier. The 7-dB pad on each side of the 778B filter prevents impedance interaction with other circuits.

3.04 The 778B bandpass filter passes the basic mastergroup signal with a loss of  $2.4 \pm 0.1$  dB. This filter suppresses frequencies below and above the basic mastergroup band to remove

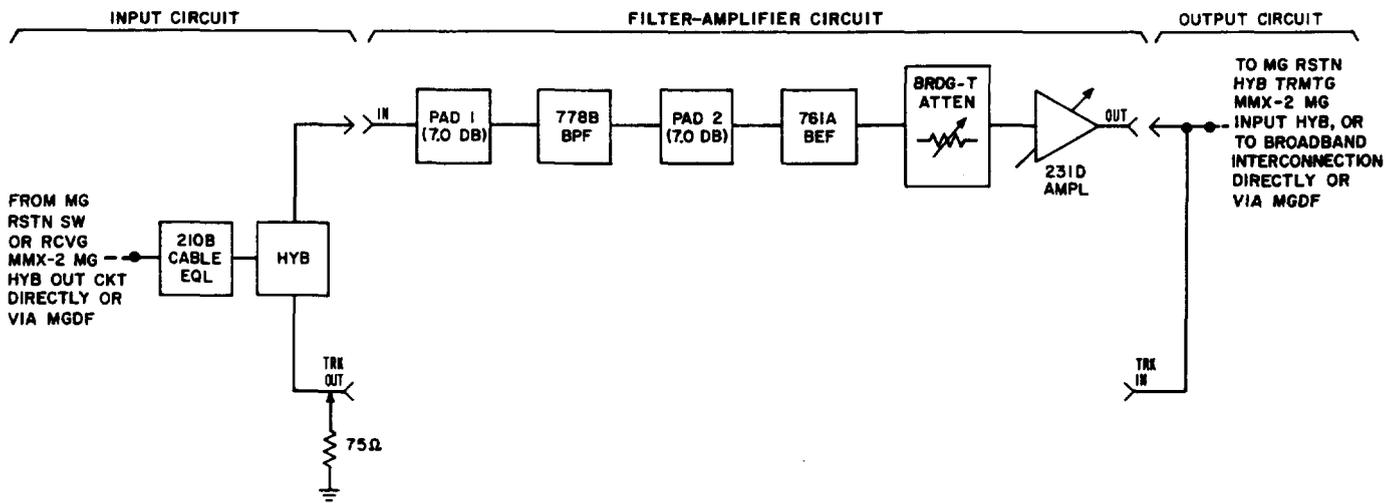


Fig. 2—Mastergroup Connector—Block Diagram

unwanted modulation products and carrier leak from the receiving MMX-2 demodulator. Figure 3 illustrates a typical insertion loss characteristic of the 778B bandpass filter.

**3.05** The 761A band-elimination filter removes the incoming 2.840-MHz mastergroup pilot to prevent interaction with the pilot inserted in the transmitting MMX-2 terminal. A typical insertion loss characteristic for the 761A band-elimination filter is illustrated in Fig. 4. The filter provides

greater than 40 dB of suppression at the 2.840-MHz mastergroup pilot frequency and presents a loss of approximately 1.35 dB to all other frequencies in the basic mastergroup band with less than  $\pm 0.05$  dB distortion.

**3.06** The variable bridged-T attenuator provides a 4.0-dB adjustment range over the basic mastergroup frequency band. This attenuator is used to adjust the level of the signal delivered to the transmitting MMX-2 terminal.

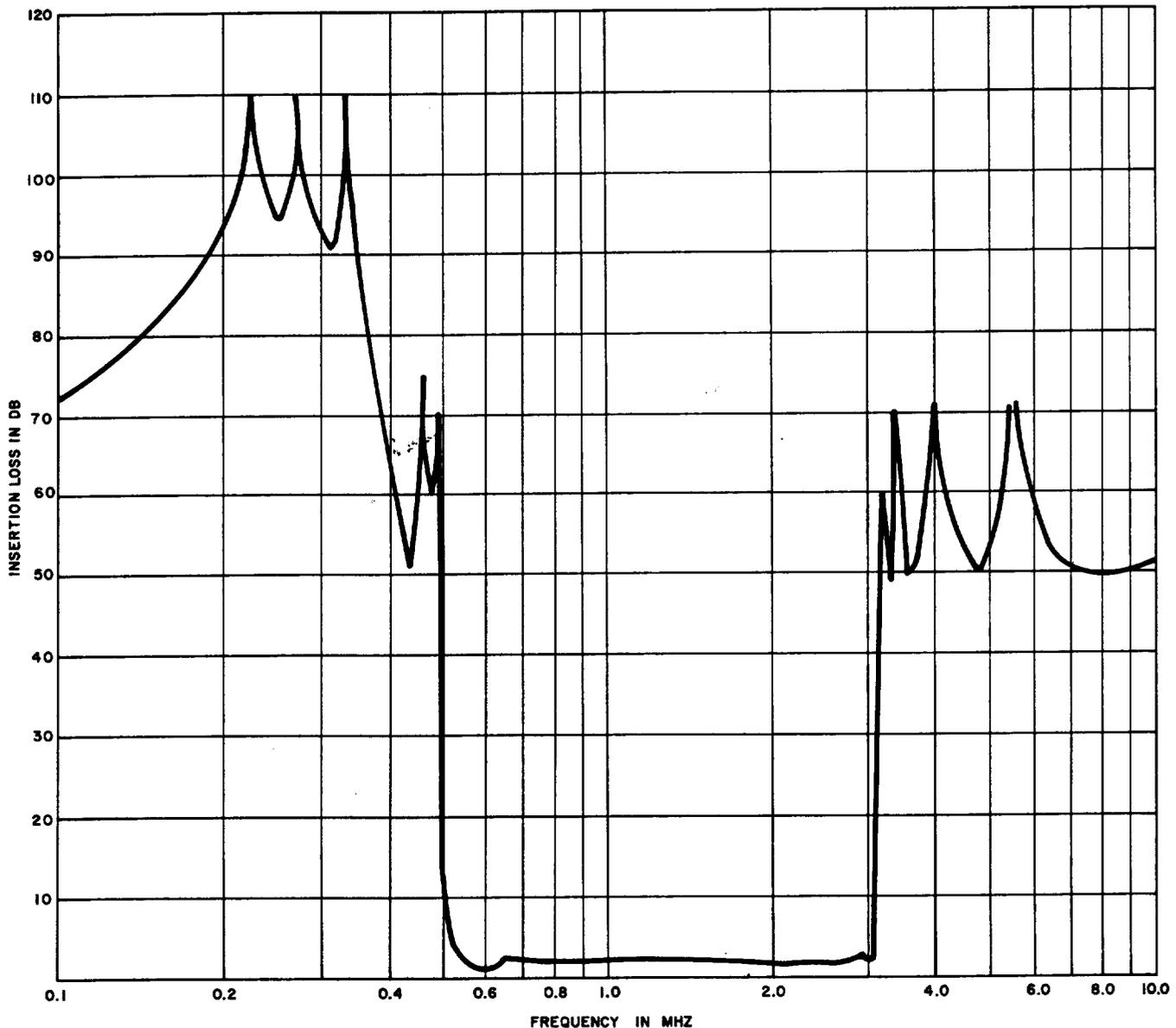


Fig. 3—778B Bandpass Filter—Insertion Loss Characteristic

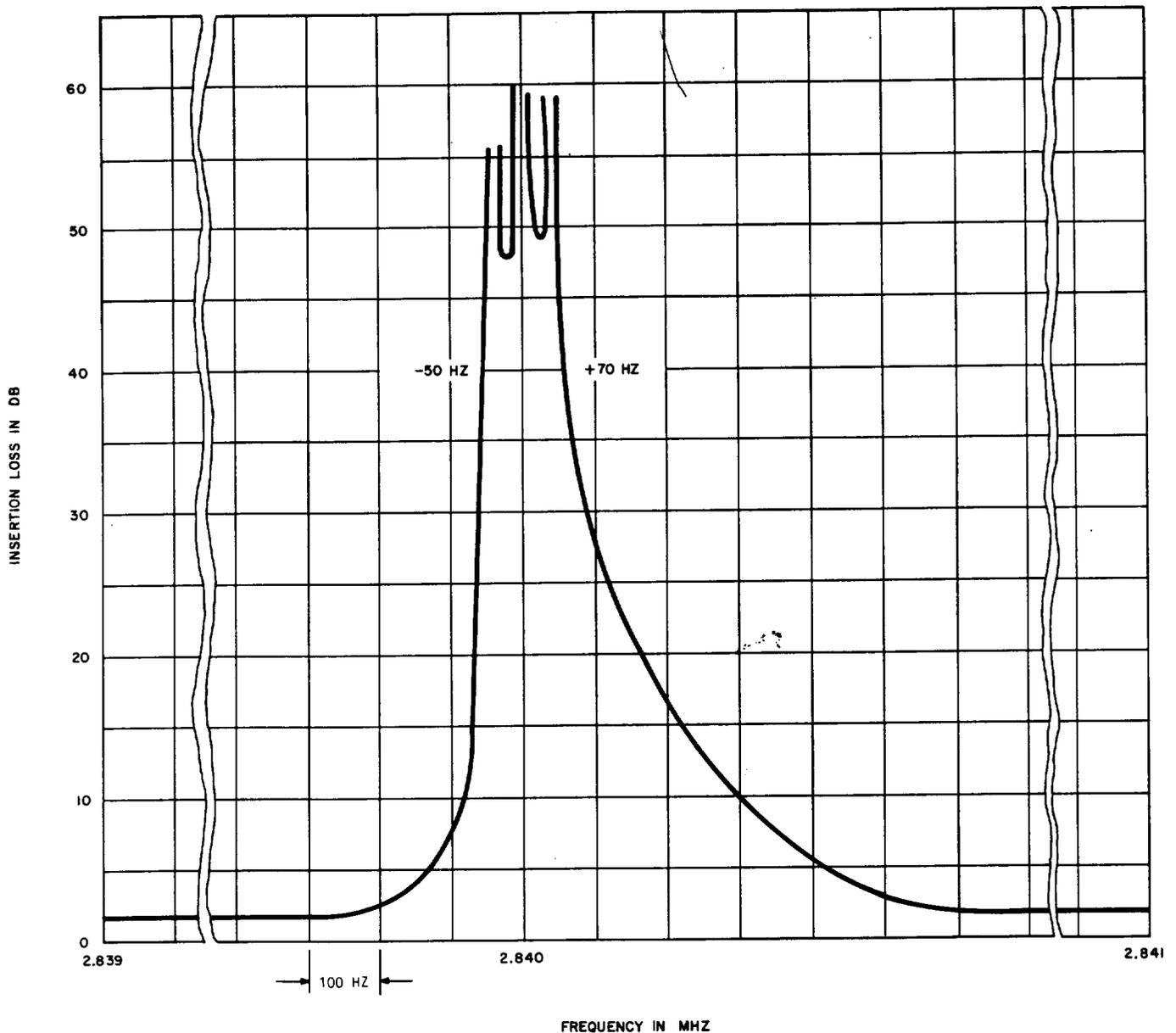


Fig. 4—761A Band-Elimination Filter—Insertion Loss Characteristic

**3.07** The 231D amplifier is a low-noise transistorized amplifier having a nominal gain of 27 dB and an adjustment range of approximately  $\pm 2$  dB. This amplifier provides the gain necessary to maintain proper transmission level in the connector circuit and permits additional level adjustment.

#### C. Output Circuit

**3.08** The output circuit consists of a T-connector, one leg of which normally connects the filter-amplifier circuit output to the transmitting

trunk. The other leg (TRK IN) is normally open and allows the patching of a spare filter-amplifier unit to the transmitting trunk.

#### D. Spare Filter-Amplifier Patching Procedures

**3.09** A spare mastergroup connector filter-amplifier circuit can be substituted for a regular mastergroup connector filter-amplifier circuit by using the patching procedures provided in Section 356-027-300.