

## DIAL RESTORATION PANEL FOR SAGE GENERAL CONSIDERATIONS

CONTENTS	PAGE
1. GENERAL . . . . .	1
2. TRANSMISSION TEST LEVEL POINTS . . . . .	1
3. SAGE 4-PHASE DATA . . . . .	1
4. SAGE AIR-GROUND VOICE COMMUNICATION SYSTEM . . . . .	2
5. SIGNALING CONSIDERATIONS . . . . .	2
6. TESTING — GENERAL . . . . .	2
7. REFERENCE SECTIONS . . . . .	3

### 1. GENERAL

1.01 This section outlines the transmission requirements for a Dial Restoration Panel (DRP) at SAGE locations requiring access to the AUTOVON Switched Network.

1.02 A reference list of the practices pertaining to this service is provided at the end of the section.

1.03 The Dial Restoration Panel (DRP) has been designed to meet various equipment and circuit features of the Air Force at SAGE Direction Centers, Direction/Combat Centers, Long Range Radar sites and possibly Radio Only sites.

1.04 The DRP is a manual 4-wire patching arrangement which has the capability to establish and restore data and air-ground communications by TOUCH-TONE Pulsing over the AUTOVON Switched Network.

1.05 Under the DRP concept, a circuit may be restored using other suitably conditioned facilities between the DRP and the serving AUTOVON office. All interchangeable 4-wire subscriber lines, PBX trunks and/or access lines must, therefore, be conditioned to the most

stringent transmission objectives for which they might be employed. In the majority of cases, this will be SAGE 4-phase data.

1.06 Basically, three classes of circuits will route via the DRP and terminate in AUTOVON offices: air-ground, SAGE 4-phase data, and PBX access lines. Some point-to-point air-ground and SAGE 4-phase data may route through the DRP and, should the need arise, be restored via the AUTOVON Switched Network.

### 2. TRANSMISSION TEST LEVEL POINTS

2.01 The DRP has been established as a -5 (transmitting) and a +1 (receiving) test level point (TLP) for all circuits. This will reduce to a minimum the requirements for on-site amplifiers except in cases of considerable distance between the Telephone Building and the DRP.

2.02 Figs. 1 and 2 show transmission level points for a typical SAGE Radio Site and a Direction Center having a DRP with both point-to-point circuits and access to AUTOVON.

2.03 Pads are adjusted to maintain constant loss for all circuits between the DRP and the serving AUTOVON office.

2.04 Normally, all circuit alignment and transmission tests will be performed at the terminal equipment (data sets, CUG and PBX trunk circuits), the drop side of the carrier equipment or the serving AUTOVON office. The use of the DRP as a point of routine testing is not contemplated.

### 3. SAGE 4-PHASE DATA

3.01 As previously mentioned, SAGE data may be established on a point-to-point or switched basis. In either case, the data signal level on the line facility should be -10 dbm at the zero transmission level point of the system.

**3.02** The SAGE 4-Phase Data Set will normally meet SAGE/BUIC performance requirements over Schedule 4, Type 4A facilities.

**3.03** SAGE data on the AUTOVON Switched Network will route via special grade trunks. These trunks conform to the Switched Services Network Transmission Plan (AB23.053.2) and are conditioned to furnish overall Schedule 4, Type 4B service with four trunks in tandem.

**3.04** 4-wire subscriber lines for SAGE 4-phase data then should conform to the Switched Services Network concept (Sections AB23.053.3 and 310-200-300) and be conditioned to provide overall Schedule 4, Type 4A service with four Type 4B trunks in tandem.

**3.05** Transmission design limits of SAGE 4-phase point-to-point facilities are discussed in Sections AB27.401.3 and 314-550-305.

#### **4. SAGE AIR-GROUND VOICE COMMUNICATION SYSTEM**

**4.01** Of the two types of air-ground operation, Common User Group (CUG) and dual facility, only CUG circuits will route via the DRP. These could be either on a point-to-point basis or switched via the AUTOVON Network.

**4.02** The arrangement of the Common User Group (CUG) equipment is shown in Figs. 1 and 2. The losses between terminals for switched or point-to-point operation are 5 db and 10 db depending upon the direction of transmission. These losses assume 2-wire telephone sets. For 4-wire sets, the losses become 10 db in either direction.

**4.03** Switched CUG circuits are considered to be normal voice grade facilities unless used alternately for data. Conditioning should conform to the Switched Services Network concept as outlined in Sections AB23.053.3 and 310-200-300.

**4.04** The transmission design requirements for point-to-point air-ground operation are furnished in Section 314-553-105.

**4.05** The CUG equipment arranged for switched operation should be modified to disable echo suppressors and to prevent interference with SF-signaling tones. This will entail replacement of the 43A1 carrier channel units and associated band elimination filters.

#### **5. SIGNALING CONSIDERATIONS**

**5.01** As shown in Fig. 2, DX-Signaling equipment may be required when E & M resistance limits are exceeded or to conserve cable facilities.

**5.02** Where possible, it may be more economical to avoid DX-Signaling by cabling the E & M leads directly to the DRP. This might occur when additional cable is required to implement the DRP, E & M supervision limits will not be exceeded or building space is a factor. Two cables, one for voice pairs and one for signaling leads, would then be necessary to avoid impulse noise interference. Care should be given to the selection of the DX simplex coils in that they should be data grade, i.e., 849-type networks, or equivalent.

#### **6. TESTING — GENERAL**

**6.01** Testing of AUTOVON access lines and subscriber lines will be performed in accordance with the 310-200-000 series.

**6.02** To assist in sectionalizing troubles, a 6-wire voice-frequency patch bay will normally be found at all DRP sites and located as shown in Figs. 1 and 2. A TOUCH-TONE telephone set equipped with appropriate line circuits will be cabled to jacks within this bay and patch cords will be used to associate the set with any desired access line or subscriber line.

**6.03** The above arrangement will provide pulsing, holding, incoming signaling and lamp indications.

**6.04** As mentioned previously, the 6-wire voice-frequency patch bay arrangement will mainly apply to sectionalizing troubles. Noise, delay and other transmission tests must be made over the entire circuit to assure satisfactory performance.

**7. REFERENCE SECTIONS*****AA Series***

AA321.051 Dial Restoration Panel —  
SAGE/BUIC

***AB Series***

AB23.053 Switched Services Networks Using  
Central Office Switching Machines—  
Transmission Design of 4-Wire Sub-  
scriber Lines and Station Equipment

AB27.401.3 A1 Digital Data System Using  
4-Phase Data Sets — General Engi-  
neering Considerations

***Plant Series***

310-200-300 Switched Services Networks Using  
Central Office Switching Machines  
— Service Maintenance

310-200-500 Switched Services Networks Using  
Central Office Switching Machines  
— Transmission Testing Methods  
in 4-Wire No. 5 Crossbar Offices

314-500-105 SAGE Data Systems — General  
Considerations and Description

314-501-105 Description of Four-Phase DDT

314-501-305 Maintenance Tests for Four-Phase  
DDT

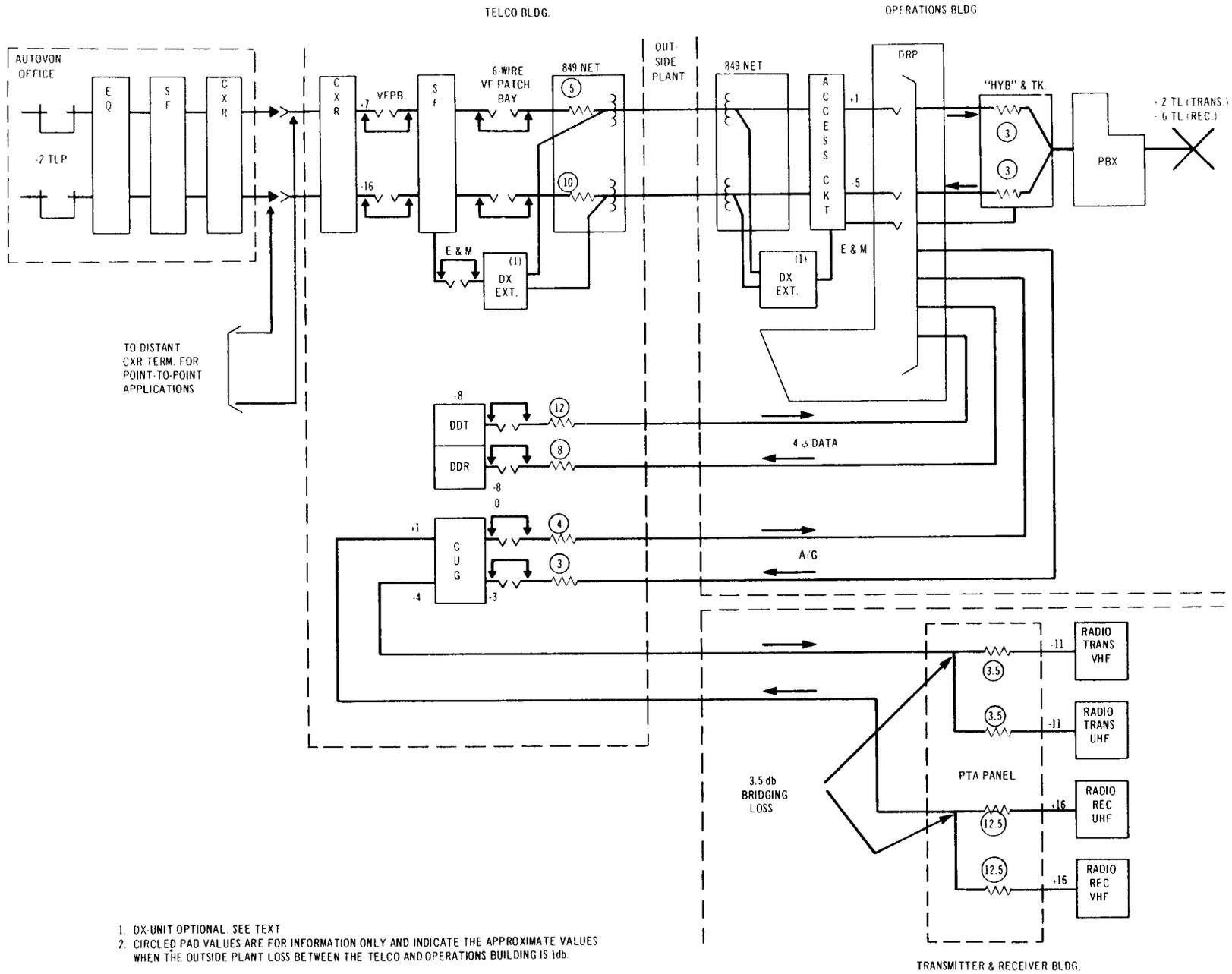
314-502-105 Description of Four-Phase DDR

314-502-305 Maintenance Tests for Four-Phase  
DDR

314-550-305 Initial Testing and Line-Up of  
SAGE Data Circuits

314-553-100 Ground-to-Air Data Systems

981-271-100 Dial Restoration Panel — General  
Descriptive Practice



1. DX-UNIT OPTIONAL. SEE TEXT
2. CIRCLED PAD VALUES ARE FOR INFORMATION ONLY AND INDICATE THE APPROXIMATE VALUES WHEN THE OUTSIDE PLANT LOSS BETWEEN THE TELCO AND OPERATIONS BUILDING IS 1db.

Fig. 1 - SAGE Radio Site

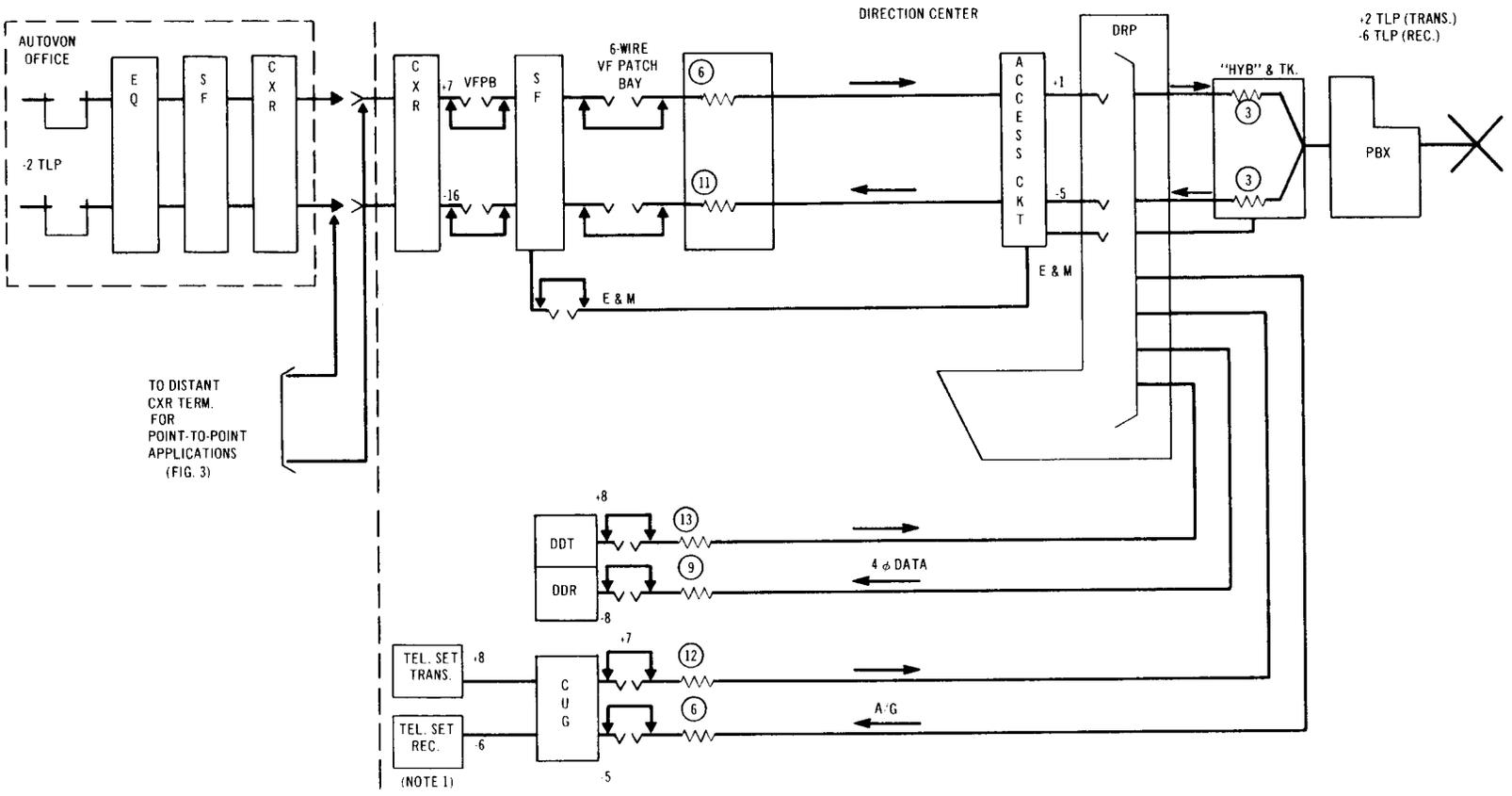


Fig. 2 - SAGE Direction Center

TO DISTANT CXR TERM. FOR POINT-TO-POINT APPLICATIONS (FIG. 3)

NOTES:  
 1. TEST LEVEL POINTS ASSUME 2-WIRE TEL. SETS. FOR 4-WIRE TEL. SETS, THE LEVEL SHOULD BE -11db AT THE RECEIVER.