SYNCHRONOUS DATA LINKS

DESCRIPTION

NO. 1B NETWORK CONTROL POINT

COMMON CHANNEL SIGNALING SYSTEMS

1. GENERAL

A. Introduction

1.01 This AT&T Practice provides a physical and functional description of the SDLs (synchronous data links) that may be used by a 1BNCP (No. 1B network control point) office. A 1BNCP is hereafter referred to in this practice as an NCP (network control point). An NCP is an office in a CCS (common channel signaling) network.

1.02 This AT&T Practice is a general revision, and as such, no revision arrows have been used to denote changes.

1.03 An NCP contains the hardware, software, and data base information used to provide a variety of custom routing and billing services. Service-related queries from offices in a CCS network are routed using the CCS packet switching technique to an NCP where replies are formulated and returned to the originating offices. For more information about a 1BNCP, see AT&T Practice 256-100-100.

B. **Definition**

1.04   An SDL (Fig. 1) is an electrical path that con-
nects an NCP with an operations support sys-
tem in a CCS network. The operations support
systems use SDLs to administer and maintain the
NCP system and data base information. The function
of SDLs is the reliable transfer of data between an
NCP and an operations support system. The SDLs
may connect an NCP with the following operations
support systems:

(a) SCANS (Software Change Administration
and Notification System)

(b) SMS (Service Management System).

1.05   The SCANS (Software Change Administra-
tion and Notification System) uses analog
4800-bps SDLs arranged for 4-wire data plus dial
backup service to distribute and administer broad-
cast warning messages at NCPs. An NCP has one
dedicated analog 4800-bps SDL to SCANS plus a
dial-up data link capability to be used for backup.

1.06   The SMS (Service Management System) uses
analog 9600-bps SDLs to administer and
maintain data base information at NCPs. An NCP
has two dedicated analog 9600-bps SDLs to SMS, one
primary SDL and one backup SDL.

2.   4800-BPS SYNCHRONOUS DATA LINK WITH DIAL BACKUP

A.   **Physical Description**

2.01   A simplified block diagram of an analog 4800-
bps SDL arranged for 4-wire data plus dial
backup service is shown in Fig. 2. A 4800-bps SDL
arranged for 4-wire data plus dial backup service
consists of the following:

(a) Synchronous data link controller (TN75C
circuit pack)

(b) 2048A data set

(c) 48FR1 data unit

(d) DAS (data auxiliary set) 829A-type CIU
(channel interface unit)

(e) Analog transmission facilities

(f) Compatible data processing equipment at
SCANS.

2.02   A synchronous data link controller (TN75C
circuit pack) is a plug-in circuit pack assembly
of an IOP (input/output processor) unit. A synchro-
nous data link controller consists of a microproces-
sor, dual access memory, and programmable read-
only memory mounted on a circuit board measuring
8 inches high and 13 inches long. Mating connectors
are mounted on 1 inch centers.
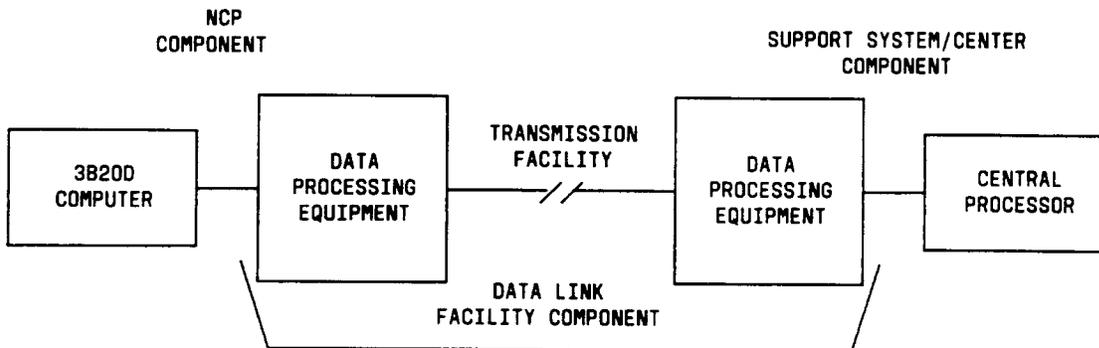
Fig. 1 — Synchronous Data Link
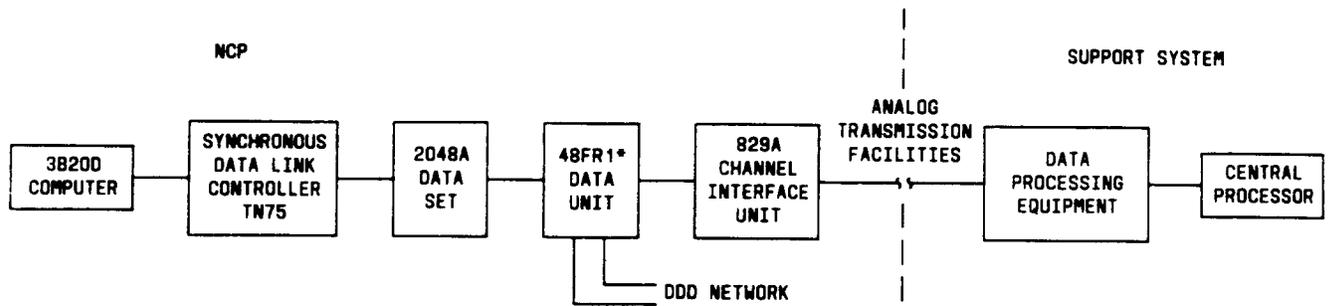
Fig. 2—Analog 4800-Bps Synchronous Data Link with Dial Backup

2.03 A 2048A data set consists of a transmitter and receiver mounted on two circuit boards with protective plates attached to a single faceplate as shown in Fig. 3. The overall dimensions are 2 inches wide, 12-1/2 inches long, and 11-1/2 inches high. A 2048A data set contains, in addition to other components, a battery and two switches. The battery is nickel/cadmium and provides power to volatile memory in the data set in the event main power is lost to prevent loss of options and network addresses. One of the two switches is used to allow the battery to be

charged. The remaining switch is used to set the rise-time option. The front faceplate (Fig. 4) contains status indicators, an alphanumeric display, and three paddle switches.

Note: The 2048A data set is a USOC (universal service ordering code) 48JBA.

2.04 A 2048A data set may be mounted in a 63A1 or 64A1 data mounting. A 63A1 data mounting is a stand-alone data mounting and may be used as
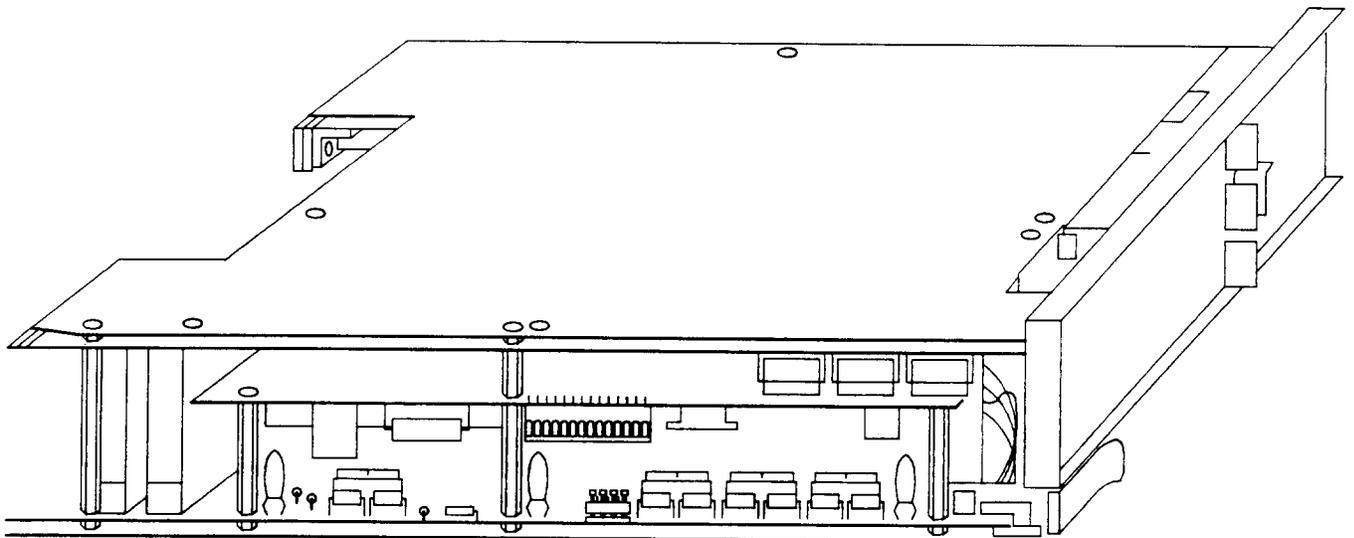

Fig. 3—2000 Series Data Set
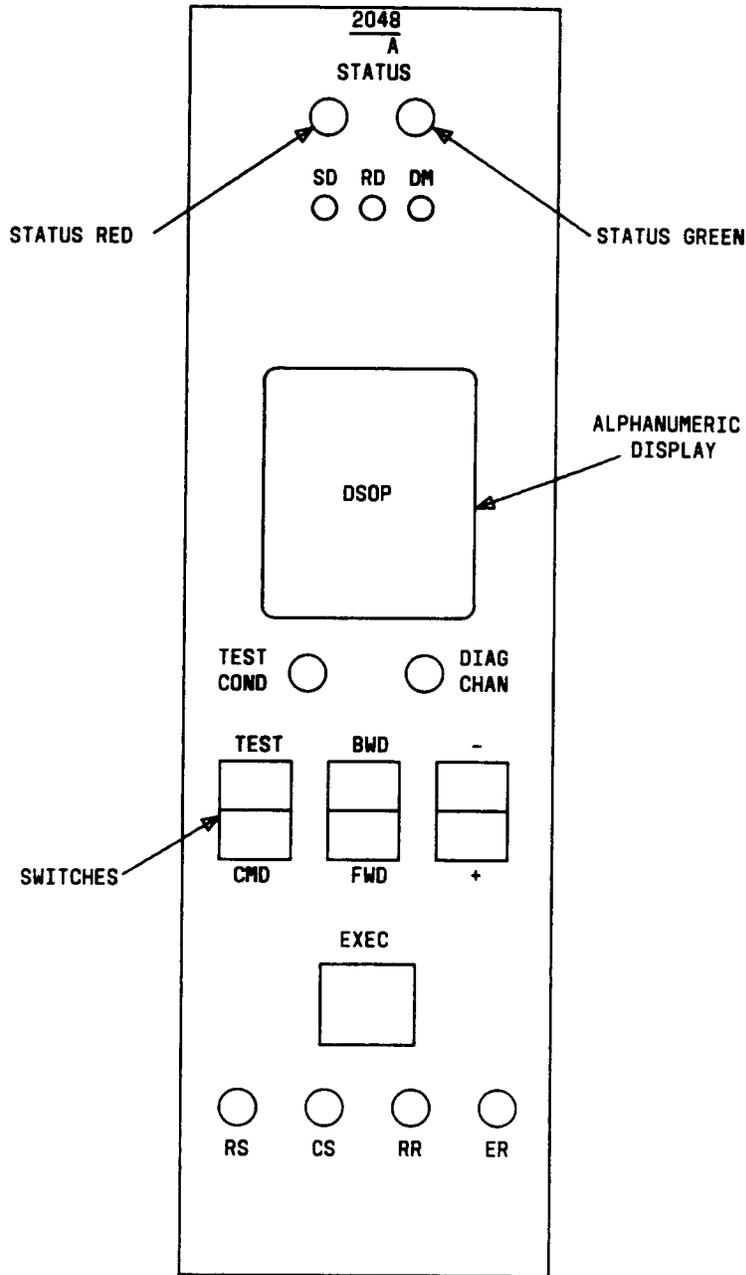
Fig. 4—2048A Data Set Faceplate

a freestanding unit on a shelf or desk. A maximum of eight 2048A data sets may be mounted in a 64A1 data mounting as shown in Fig. 5. The 63A1 and 64A1 data mountings provide power and connectors for cabling to a synchronous data link controller and a 48FR1 data unit. All connections to a 2048A data set are made through a 63A1 or 64A1 data mounting. A 64A1 data mounting may be mounted in a KS-20018 L15C cabinet.

2.05 A 48FR1 data unit is 1-1/4 inches wide, 5-1/2 inches high, and 10-1/16 inches deep. The 48FR1 data unit consists of component apparatus mounted on a plug-in circuit board. Two gain control switches and three installer options (call control,

DATA SET —→
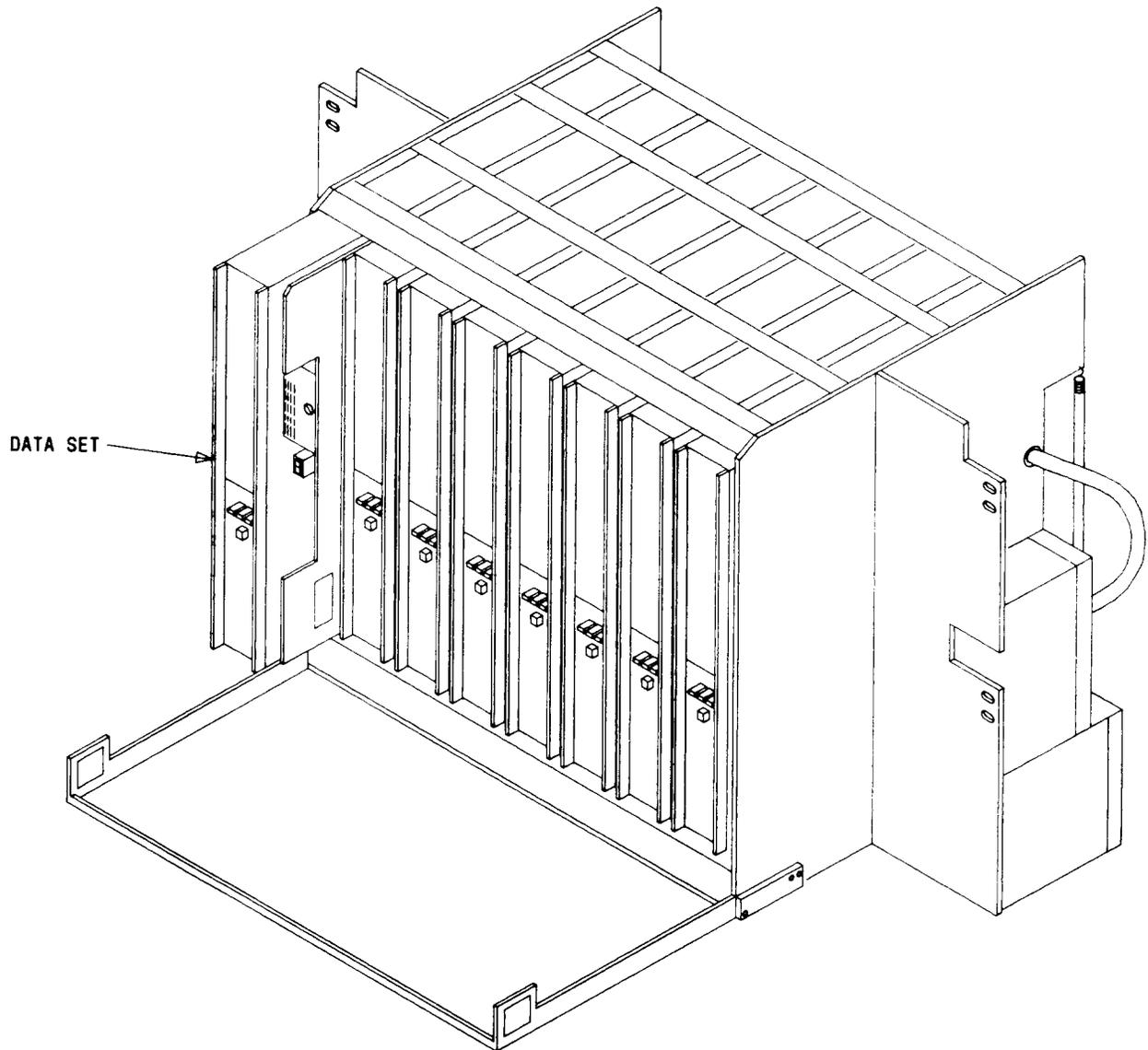
Fig. 5—64A1 Data Mounting

unit control, and power supply) are located on the circuit board. Two test jacks, a nonlocking switch, and a dial backup indicator light are located on the front faceplate (Fig. 6). The jacks will accept a standard 310-type plug. A handle is also provided on the front faceplate to facilitate removal of the 48FR1 data unit from a data mounting.

Note: The 48FR1 data unit is a USOC code DGK 03. Any equivalent data unit may be used.

2.06 One 48FR1 data unit and one data auxiliary set 829A-type channel interface unit are housed in a 59A1 data mounting (Fig. 7). A 59A1 data mounting provides power and connectors for cabling to 4-wire analog transmission facilities, a 4-wire dial backup channel consisting of two 2-wire switched network lines, and a 2048A data set. All connections to a 48FR1 data unit are made through the 59A1 data mounting. A 59A1 data mounting may be used as a freestanding unit on a desk or shelf or be wall mounted.
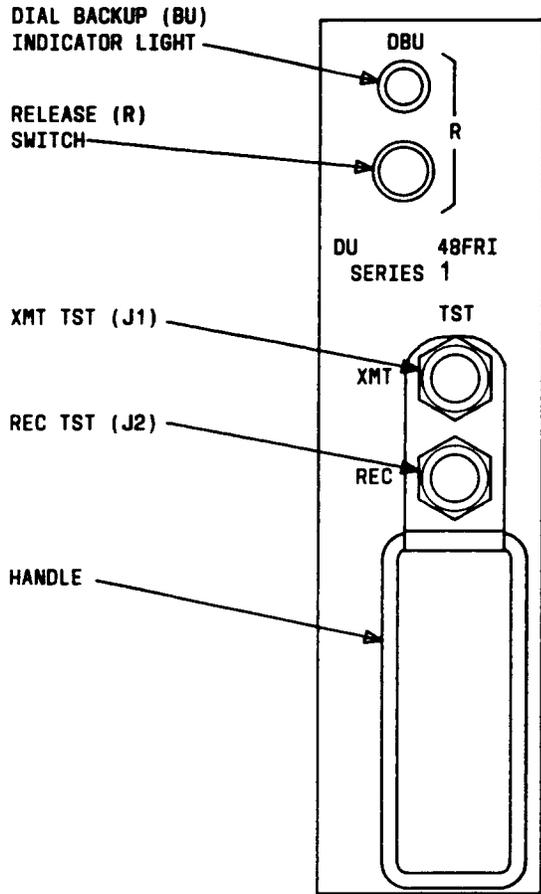
DIAL BACKUP (BU)
INDICATOR LIGHT

RELEASE (R)
SWITCH

XMT TST (J1)

REC TST (J2)

HANDLE

Fig. 6—48FR1 Data Unit

2.07 A DAS (data auxiliary set) 829A-type CIU
(channel interface unit) consists of component apparatus mounted on a plug-in circuit board. Two variable attenuators and two installer options (line impedance and sealing current) are located on the circuit board. Two test jacks and two monitoring jacks are located on the 829A CIU faceplate (Fig. 8). The jacks will accept a standard 310-type plug. An 829A CIU is 1-1/3 inches wide, 5-1/2 inches high, and 9-2/3 inches long.

2.08 One 829A CIU and one 48FR1 data unit may
be housed in a 59A1 data mounting (Fig. 7). A 59A1 data mounting provides power and connectors for cabling to 4-wire analog transmission facilities, a 4-wire dial backup channel consisting of two 2-wire switched network lines, and a 2048A data set. All connections to an 829A CIU are made through the 59A1 data mounting. A 59A1 data mounting may be used

as a freestanding unit on a desk or shelf or be wall mounted.

2.09 The analog transmission facilities are 3002-
type, 4-wire private line voiceband data channels to compatible data processing equipment at SCANS.

B. Functional Description

2.10 A synchronous data link controller (TN75C
circuit pack) interfaces an SDL to the AT&T 3B20D computer used in an NCP. A synchronous data link controller is the controller interface for the 3B20D computer to communicate with an SDL which has compatible transmission rates. A synchronous data link controller is configured with microprocessor, timing, and related circuitry to transmit and receive from an SDL. A synchronous data link controller also performs parallel/serial data conversions. Parallel format data from the 3B20D computer is converted to serial data for the 2048A data set, and serial data from a data set is converted to parallel data for the 3B20D computer. A protocol chip on the synchronous data link controller performs the data format conversions.

2.11 A 2048A data set is a synchronous, serial, bi-
nary transmitter-receiver that operates at 4800 bps over 4-wire facilities. A 2048A data set acts as a digital/analog interface between a synchronous data link controller and a 48FR1 data unit. Analog data from a 48FR1 data unit is converted to digital format for the synchronous data link controller, and digital data from a synchronous data link controller is converted to analog format for use by the analog facilities. A 2048A data set also has self-test capabilities that make possible data set and data link tests without external test equipment.

2.12 A 48FR1 data unit provides the switching,
ring detection, and transmission circuitry required to add 4-wire dial backup service to a 4-wire synchronous data link. In the 4-wire data mode the transmit and receive leads from the 2048A data set are cut through to the data auxiliary set 829A-type channel interface unit (Fig. 9). In the dial backup mode, relay "A" within the 48FR1 data unit transfers the transmit and receive leads from the 2048A data set to the 4-wire dial backup channel. The 4-wire dial backup channel consists of two 2-wire DDD lines. A 48FR1 data unit is provided with several options that may be requested.
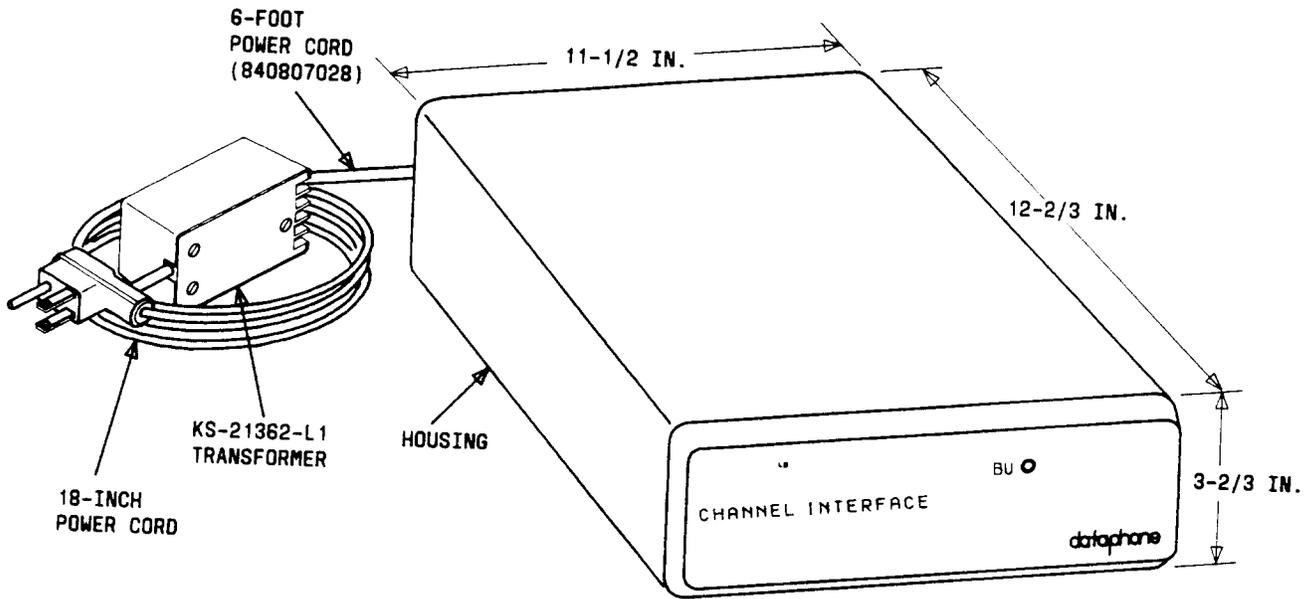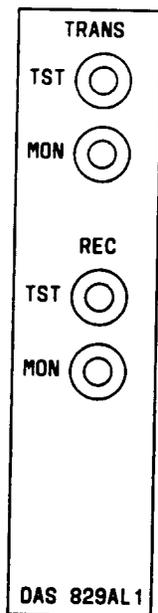
Fig. 7—59A1 Data Mounting

Fig. 8—Data Auxiliary Set 829A-Type Channel Interface Unit

2.13 A DAS (data auxiliary set) 829A-type CIU (channel interface unit) functions as a channel interface unit to provide a prewired and tested stan-

dard termination for 4-wire private line voiceband data channels. An 829A CIU also provides level control and a loopback mode of operation to permit testing of the transmission facilities from a remote test center (Fig. 10).

3. 9600-BPS SYNCHRONOUS DATA LINKS

A. Physical Description

3.01 A simplified block diagram of an analog 9600-bps SDL is shown in Fig. 11. An analog 9600-bps SDL consists of the following:

(a) Synchronous data link controller (TN75C circuit pack)

(b) 2096A data set

(c) DAS (data auxiliary set) 829A-type CIU (channel interface unit)

(d) Analog transmission facilities

(e) Compatible data processing equipment at SMS.

3.02 A synchronous data link controller (TN75C circuit pack) is a plug-in circuit pack assembly
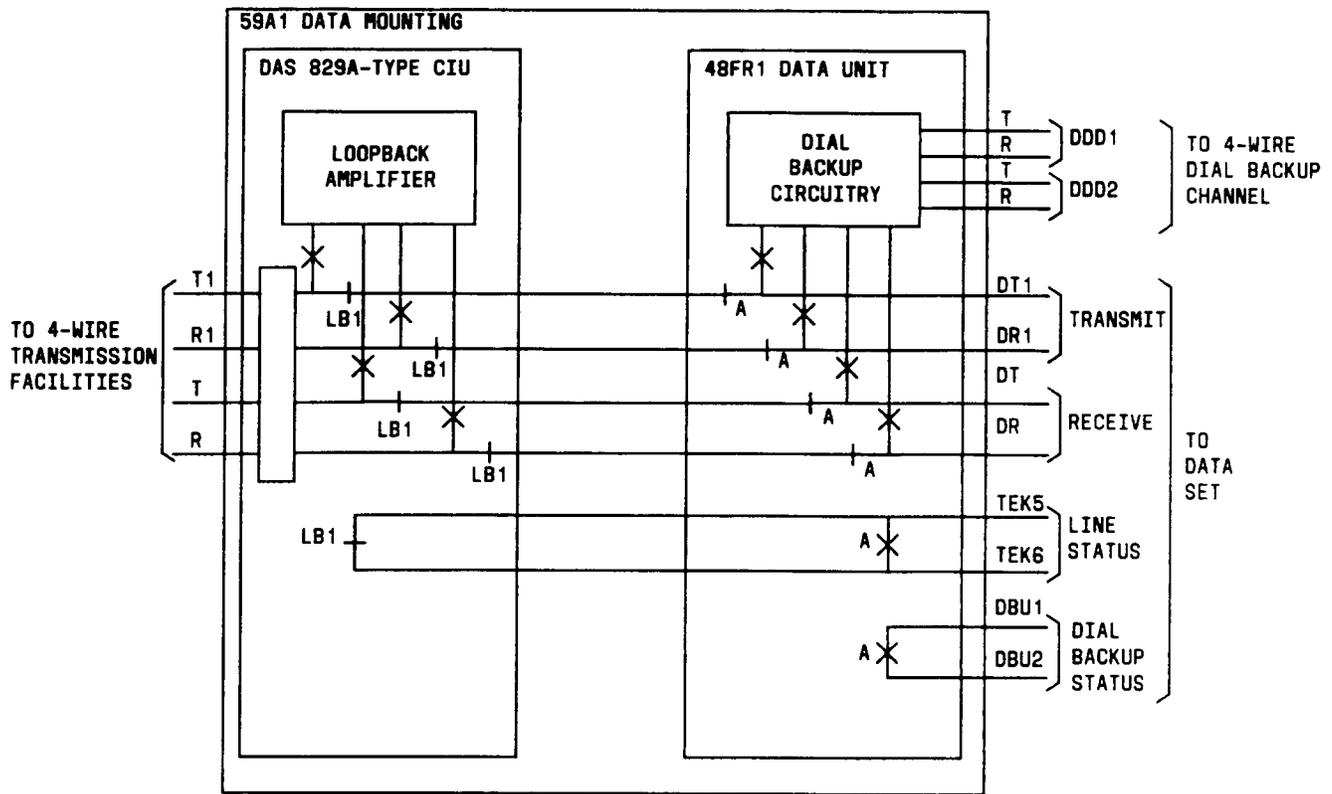
Fig. 9—4-Wire Data Plus Dial Backup Service

of an IOP (input/output processor) unit. A synchronous data link controller consists of a microprocessor, dual access memory, and programmable read-only memory mounted on a circuit board measuring 8 inches high and 13 inches long. Mating connectors are mounted on 1 inch centers.

3.03 A 2096A data set consists of a transmitter and receiver mounted on two circuit boards with protective plates attached to a single faceplate as shown in Fig. 3. The overall dimensions are 2 inches wide, 12-1/2 inches long, and 11-1/2 inches high. A 2096A data set contains, in addition to other components, a battery and two switches. The battery is nickel/cadmium and provides power to volatile memory in the event main power is lost to prevent loss of options and network addresses. One of the two switches is used to allow the battery to be charged. The remaining switch is used to set the rise-time option. The front faceplate (Fig. 12) contains status indicators, an alphanumeric display, and three paddle switches.

3.04 A 2096A data set may be mounted in a 63A1 or 64A1 data mounting. A 63A1 data mounting is a stand-alone data mounting and may be used as a freestanding unit on a shelf or desk. A maximum of eight 2096A data sets may be mounted in a 64A1 data mounting as shown in Fig. 5. The 63A1 and 64A1 data mountings provide power and connectors for cabling to synchronous data link controllers and 829A CIUs (channel interface units). All connections to a 2096A data set are made through a 63A1 or 64A1 data mounting. A 64A1 data mounting may be housed in a KS-20018 L15C cabinet.

3.05 A DAS (data auxiliary set) 829A-type CIU (channel interface unit) consists of component apparatus mounted on a plug-in circuit board. Two variable attenuators and two installer options (line impedance and sealing current) are located on the circuit board. Two test jacks and two monitoring jacks are located on the 829A CIU faceplate (Fig. 8). The jacks will accept a standard 310-type plug. An 829A CIU is 1-1/3 inches wide, 5-1/2 inches high, and 9-2/3 inches long.
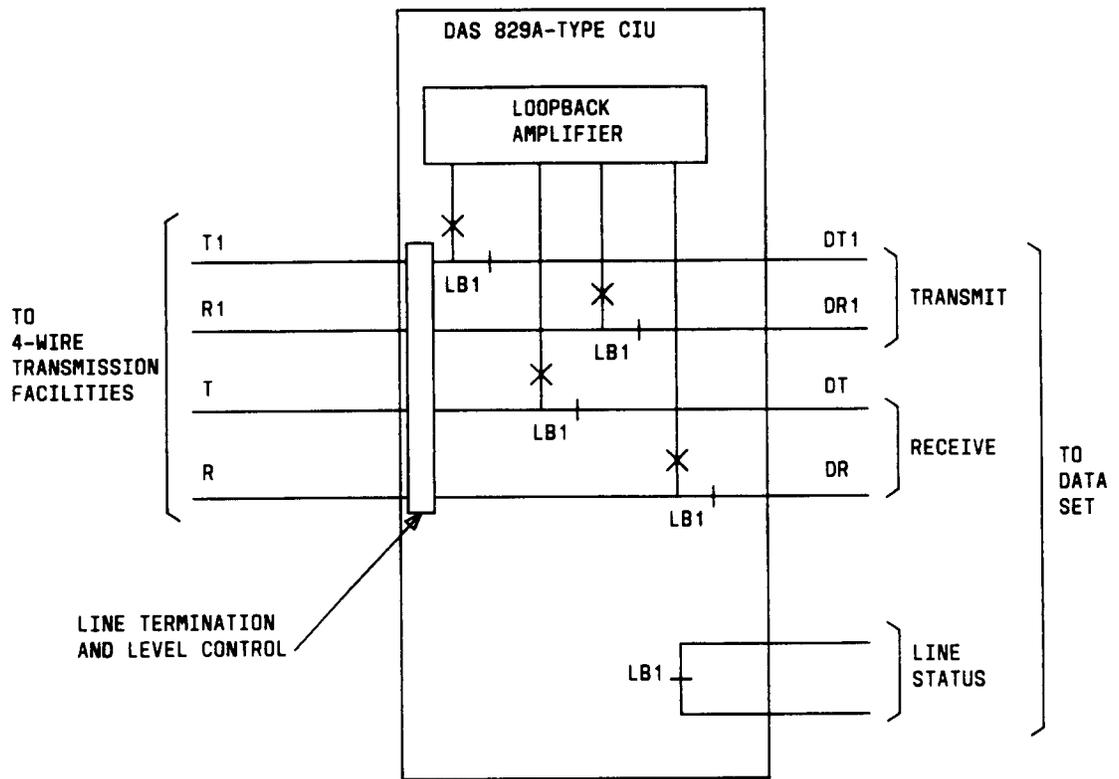
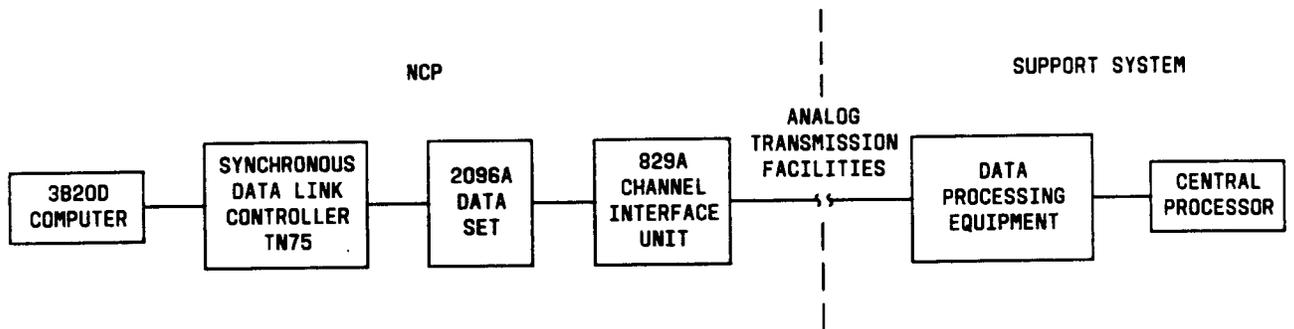Fig. 10—DAS 829A-Type CIU (4-Wire Data Service)

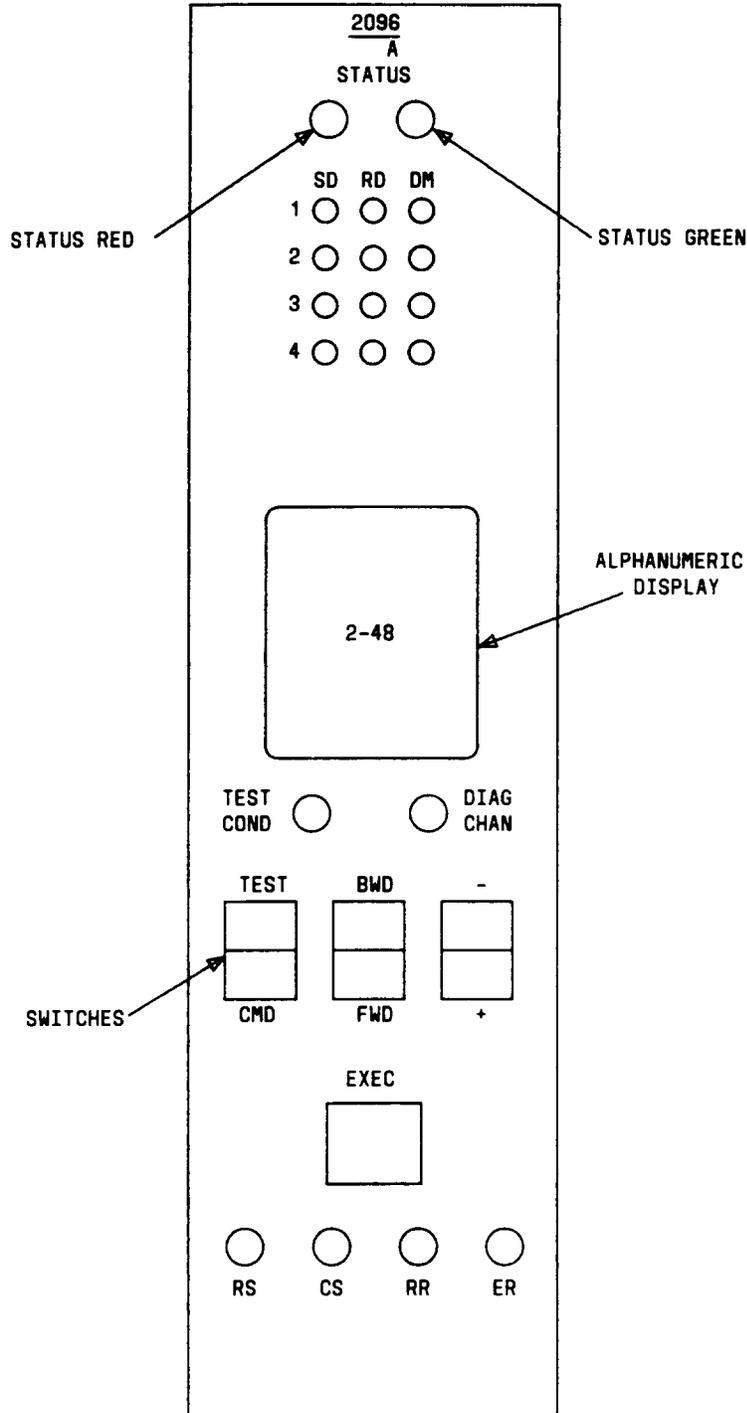Fig. 11—Analog 9600-Bps Synchronous Data Link

Fig. 12 — 2096A Data Set Faceplate

3.06 A maximum of eight 829A CIUs may be mounted in a 46A1 data mounting as shown in Fig. 13. A 46A1 data mounting provides power and connectors for cabling to 4-wire transmission facilities and data sets. All connections to an 829A CIU are made through the 46A1 data mounting. A 46A1 data mounting may be mounted in a KS-20018 L15C cabinet.

3.07 The analog transmission facilities are 3002-type, 4-wire private line voiceband data channels with high performance data conditioning to compatible data processing equipment at SMS.

B. Functional Description

3.08 A synchronous data link controller (TN75C circuit pack) interfaces an SDL to the AT&T 3B20D computer used in an NCP. A synchronous data link controller is the controller interface for the 3B20D computer to communicate with an SDL which has compatible transmission rates. A synchronous data link controller is configured with microprocessor, timing, and related circuitry to transmit and receive from an SDL. A synchronous data link controller also performs parallel/serial data conversions. Parallel format data from the 3B20D computer is converted to serial data for the 2096A data set, and serial data from a data set is converted to parallel data for the 3B20D computer. A protocol chip on the synchronous data link controller performs the data format conversions.

3.09 A 2096A data set is synchronous, serial, binary transmitter-receiver that operates at 9600 bps over 4-wire facilities. A 2096A data set acts as a digital/analog interface between a synchronous data link controller and an 829A CIU (channel interface unit). Analog data from an 829A CIU is converted to digital data that can be used by a synchronous data link controller, and digital data from a synchronous data link controller is converted to analog format for use by the analog facilities. A 2096A data set also has self-test capabilities that make possible data set and data link tests without external test equipment.

3.10 A DAS (data auxiliary set) 829A-type CIU (channel interface unit) functions as a channel interface unit to provide a prewired and tested standard termination for 4-wire private line voiceband data channels. An 829A CIU also provides level control and a loopback mode of operation to permit testing of the transmission facilities from a remote test center.

4. MAINTENANCE

4.01 Synchronous data link maintenance is defined to mean all preventive and corrective maintenance of an SDL from the AT&T 3B20D computer at an NCP to the equivalent interface at the operations support system end of the SDL. Synchronous data link maintenance includes maintenance surveillance to determine the status of the SDLs, a means of removing an SDL and its associated peripheral equipment from service, diagnostics for trouble isolation,

FUSES

DAS 829A-TYPE
CHANNEL INTERFACE
UNITS
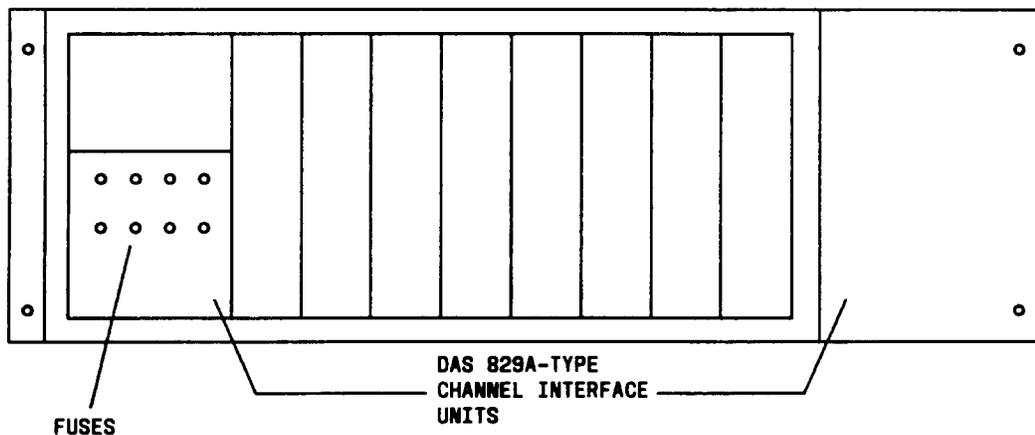
Fig. 13—46A1 Data Mounting

and provisions for end-to-end tests of the SDL transmission facilities.

4.02 An SDL may be considered as consisting of three components from a corrective maintenance point of view.

(1) The NCP component consisting of the 3B20D computer hardware and software

(2) The data link facility consisting of the data sets

(3) The operations support system component consisting of the hardware and software provided by the operations support system to perform the equivalent functions of the NCP component.

4.03 The NCP personnel are responsible for coordinating all SDL maintenance activity with the appropriate operations support system. Before attempting corrective maintenance procedures, an SDL must be removed from service, and diagnostic programs should be used to check the 3B20D computer hardware. After an SDL trouble has been isolated and corrected, the SDL must be returned to service.

4.04 There are no preventive (or scheduled) maintenance procedures to be performed on SDLs. The normal mode of operation with the error checking provisions provides adequate on-line tests. For more information about synchronous data link maintenance and testing, see AT&T Practice 256-100-580.

5. GLOSSARY

5.01 The following list of acronyms and abbreviations are the most commonly used when referring to SDLs.

bps	bits per second
CCS	common channel signaling
CCSS	Common Channel Signaling Systems
CIU	channel interface unit
CP	circuit pack
DAS	data auxiliary set
DDD	direct distance dialing
IOP	input/output processor
kbps	kilobits per second
NCP	network control point
OSS	operations support system
SCANS	Software Change Administration and Notification System
SDL	synchronous data link
SDLC	synchronous data link controller
SMS	Service Management System
1BNCP	No. 1B network control point