PRIVATE LINE SERVICE TERMINATIONS
STATION ENGINEERING INFORMATION
STATION EQUIPMENT (DATA-WIDEBAND)

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CONTENTS PAGE

1. GENERAL

1.01 This section provides general information intended to aid those involved in implementing wideband data services.

Comments concerning contents, usability and adequacy of this practice will be welcome. Mail comments directly to the Bell System Practices Organization.

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1.02 This section is reissued to provide current reference information.

1.03 This section provides:

- Description of wideband data services
- Outline of project team activities and procedures
- Various standard station arrangements for terminating wideband data services
- References and tables to assist in implementing wideband data service.

1.04 The objective of the Bell System is to efficiently provide customers with wideband services. Achieving this consistently requires good planning and organizing, and careful coordination of the Universal System Service Orders (USSO). It requires the careful gathering and analyzing of information received at different times from several sources. Working closely with other offices, departments, and companies is of the utmost importance.

1.05 This practice will provide standard station arrangements and procedures to be applied to all orders for wideband services. This will provide a guideline for coordinating implementation with other departments and companies.

1.06 General notes for all figures appear on a foldout on the last page of this section.

1.07 For general information for the entire Private Line Service Terminations series, refer to Section 812-002-200.

1.08 Section 812-002-201, Uniform Service Order Code (USOC) Index of Definitions and Applications, complements this section with additional information and references. It provides coordination for the entire Private Line Service Terminations series, and will be maintained to reflect changes in the related sections.

2. PRIVATE LINE SERVICE TERMINATIONS SERIES

2.01 The following sections constitute the Private Line Service Terminations series. All of these are related sections.

SECTION	TITLE
812-002-200	General Information
812-002-201	Uniform Service Order Code (USOC) Index of Definitions and Applications
812-002-210	PBX Terminations (Tie Trunk and SS-3)
812-002-211	PBX Terminations (Foreign Exchange and Wide Area Telecommunications Service)
812-002-215	Telephoto Station Arrangements
812-002-221	Station Equipment (Voice)
812-002-230	Station Equipment (Data Voiceband)
812-002-231	Station Equipment (Data Wideband)
812-002-250	Alternate Arrangements
812-002-270	Engineering Sketches and Signaling Devices
812-002-290	V4 Repeater Mountings and Components

3. INDEX OF TABLES

3.01 The following is an index of tables that provide additional information for the provision of wideband data service:

Table A—Wideband Service Terminals (USOC)

Table B—Data Set 303-Type—Speed Designations

Table C—Data Set 303-Type—Code Matrix

Table D—Wideband Equipment

Table E—KS-20018—Cabinet Dimensions

Table F—Wideband Data Station—Mounting Hardware

4. WIDEBAND DATA SERVICES

4.01 Wideband data service offerings include channels, service terminals, switching services, and alternate use services; for example, voice frequency services or different types of wideband services alternating with each other. Only point to point services applications are covered in this section.

4.02 Information in this section is based on Federal Communications Commission (FCC) Tariff 260 and applies to interstate service. When these services are provided intrastate, the features and charges are determined by Associated Company tariffs. The various elements necessary to provide wideband data service for interstate and intrastate will be the same.

4.03 Part 9 of this section provides Project Guidelines for implementing Wideband data services.

Channels

4.04 Channels are ordered between rate centers and include Series 5000 and 8000.

4.05 Series 5000 channels (IXC) are designed for large capacity facility requirements between specified points. Base capacity is provided for transmitting voice, teletypewriter, data or any of the types of service for which service terminals are provided.

4.06 The following two types of Base Capacity are furnished in this series.

USOC	TYPE	BANDWIDTH	VOICE CHANNEL EQUIVALENT	REFERENCE
1LKCW	5700	240 kHz	60	ISM Sec 76
1LKDW	5800	1000 kHz	240	ISM Sec 76

Base capacity may be used as a wideband channel, a series of wideband channels, and/or individual channels of lesser capacity.

4.07 Series 8000 channels (IXC) have a maximum spectrum of approximately 48 kHz. This series has a capacity for transmitting high speed data and facsimile or for use as individual voice grade channels up to a maximum of twelve in a single discrete facility.

USOC	TYPE	BANDWIDTH	VOICE CHANNEL EQUIVALENT	REFERENCE
1LKAW	8800	48 kHz	12	ISM Sec 80

4.08 Most wideband terminals come equipped with a voice coordinating channel. The channel is a part of the wideband termination and is included in the wideband capacity.

4.09 Wideband channels must be equipped with suitable service terminals. Service terminals are designated on the USSO by USOC which describes the class of service for which there is a tariff charge. The service terminal includes the voice-frequency coordinating channel, the station, a share of the Wideband Service Bay and Wideband Data Test Bay, the L Modem, and part of the LMX terminal equipment.

4.10 See Table A for the wideband service terminals. This will provide the USOCs and other pertinent information.

5. WIDEBAND DATA STATION INFORMATION

5.01 Wideband data stations are designed to provide high-speed wideband data service with a voice coordination circuit that may be used for speech or for transmission of low-speed data.

5.02 The data station serves as part of a wideband data system for use in the transmission of serial binary synchronous or nonsynchronous data over half group, group, supergroup, T facilities, or any other facility with sufficient bandwidth for the particular data rate.

5.03 Wideband data stations are designed to transmit synchronous data at speeds of 19.2, 50.0, 230.4, and 460.8 kilobits per second (kbps). Speeds of 18.75, 40.8, and 200 kbps are available for special applications. The 18.75 kbps data sets are available only with balanced customer interface. Minimum signal element duration for non-synchronous transmission over half-group, group, and supergroup facilities are 52, 20, and 4.3 Msec, respectively; for nonsynchronous transmission using dc balanced

TABLE A

WIDEBAND SERVICE TERMINALS

USOC	SERVICE TERMINAL TYPE	BANDWIDTH IN KHZ OR DATA RATE IN BITS/SEC	EQUIVALENT VOICE CHANNELS	REFERENCE	REMARKS
DY4A1	5701	10 Hz to 20 kHz	12	ISM Sec 77	Does not include a voice coordination channel
		or			
DY4A2	5701	40,800 bits/sec	12	ISM Sec 77	Includes one voice channel for coordination
		or			
DY4A4	5701	50,000 bits/sec	12	ISM Sec 77	Asynchronous or synchronous operation; includes one voice channel for coordination
91DA3	5703	29 to 44 kHz	6	ISM Sec 77	Designed for 2-level facsimile transmission; includes one voice channel for coordination
91DA5	5703	19,200 bits/sec	6	ISM Sec 77	Synchronous operation; includes one voice channel for coordination
P3X	5706	50,000 bits/sec	12	ISM Sec 77	Designed for the transmission of secure communications and furnished to a department or agency of the U.S. Government; a supervisory signal arrangement is included

TABLE A (Cont)

USOC	SERVICE TERMINAL TYPE	BANDWIDTH IN KHZ OR DATA RATE IN BITS/SEC	EQUIVALENT VOICE CHANNELS	REFERENCE	REMARKS
UP6	5708	50,000 bits/sec	12	ISM Sec 77	Asynchronous or synchronous operation; designed for use with 50 Kilobit switched service; includes one voice channel for coordination
DZ4C1	5751	0 Hz to 100 kHz	60	ISM Sec 77	Does not include a voice coordination channel
DZ4C5		230,400 bits/sec	60	ISM Sec 77	Asynchronous or synchronous operation; includes one voice channel for coordination
G6PA1	8801	10 to 20 kHz	12	ISM Sec 80	Does not include a voice coordination channel
G6PA2	8801	40,800 bits/sec	12	ISM Sec 80	Includes one voice channel for coordination
G6PA4	8801	50,000 bits/sec	12	ISM Sec 80	Asynchronous or synchronous operation; includes one voice channel for coordination; supplementary control arrangement allows voice channel to be used solely or alternately for transmission of restricted 3-of-14 code at up to 20 code combinations per second
G8PA3	8803	29 to 44 kHz	6	ISM Sec 80	Designed for 2-level facsimile transmission; includes one voice channel for coordination
G8PA5	8803	19,200 bits/sec	6	ISM Sec 80	Synchronous transmission; includes one voice channel for coordination

line signals over digital facilities, minimum durations are 2.0 Msec.

5.04 Fig. 1 is a block diagram of a complete wideband data system with restored polar operation. Fig. 2 shows a block diagram of a wideband data system with dc-coupled balanced line signals.

5.05 The wideband data station accepts serial high-speed, or serial high-speed and parallel low-speed data signals from a business machine and transmits the signals to the receiving station over the transmission facilities.

5.06 For restored polar operation (Fig. 1), both the wideband and voiceband signals are fed from the wideband service bay to the wideband modem (if applicable). The wideband modem accepts both voice-frequency and wideband data signals and modulates the signals to carrier-frequency signals for transmission over L or N-type carrier multiplex facilities. At the receiving end, these signals are demodulated to baseband frequencies.

5.07 For dc-balanced line signals (Fig. 2), the data set encodes the serial binary data into a form so that it is compatible with the T1WM4 wideband modem. The T1WM4 wideband modem converts the data signal to a T1 line signal which is transmitted to the central office via a T1 line.

5.08 A wideband data station will vary in complexity, depending on the features provided. The configurations covered will be those most commonly used for point to point private line commercial service.

5.09 The following is a description of components that comprise a wideband data station.

Data Set 303-Type

5.10 Wideband data stations using Data Set 303-type provide full duplex, high speed data transmission over a 4-wire wideband channel. The wideband data station receives high-speed, on off, baseband signals from the customer and processes these baseband signals for transmission over the line facilities. The received high-speed data signals are reconstituted for customer use.

5.11 The Data Set 303-type is designed to operate at synchronous speeds of 19.2, 50.0, 230.4, and 460.8 kilobits per second (kbps). Speeds of 18.75, 40.8, and 200 kbps are available for special applications. Minimum signal element duration for nonsynchronous transmission over half-group, group, and supergroup facilities are 52, 20, and 4.3 M second, respectively. For nonsynchronous transmission using dc-coupled balanced line signals over digital facilities, the minimum duration is 2.0 M second.

5.12 Synchronous versions of data set 303-type are used with serial digital devices such as computers; nonsynchronous versions can be used with 2-level baseband facsimile equipment.

5.13 Data Set 303 provides either of two customer interfaces (balanced or unbalanced). The unbalanced customer interface is used in commercial service applications, while the balanced customer interface is for use in special government applications. The unbalanced customer interface provides signal leads for transmitting and receiving data plus control leads, which indicate the status of the station and the customer equipment. The balanced customer interface provides only signal leads.

5.14 The DS 303-Type employs either dc-coupled balanced line signal or restored polar-type signal format. The restored polar-type data set is generally used except where it is feasible to extend a T1 line facility to the customers premises and locate a T1WM4 modem within 1000 feet of the data set. Where the T1WM-4 is used in such a configuration, the restored polar-type line signal is not required. A simpler version of the data set is used and the line signal is referred to as a dc-coupled balanced line signal. See Tables B and C for a description of the 303-type data sets. For detailed information, see Section 593-012-100 and CD- and SD-1D100-01.

Data Auxiliary Set 809B1

5.15 DAS 809B1 is a vestigial sideband unit which provides an additional modulation step in half-group operation (19.2 kbps) in conjunction with a 303-type data set when connected to L- or N-type carrier systems. When a dc-coupled balanced line interface DS 303-type is used, DAS 809B1 is not required at the data station.

5.16 For more detailed information, see Section 598-034-100 CD- and SD-1D067-01.

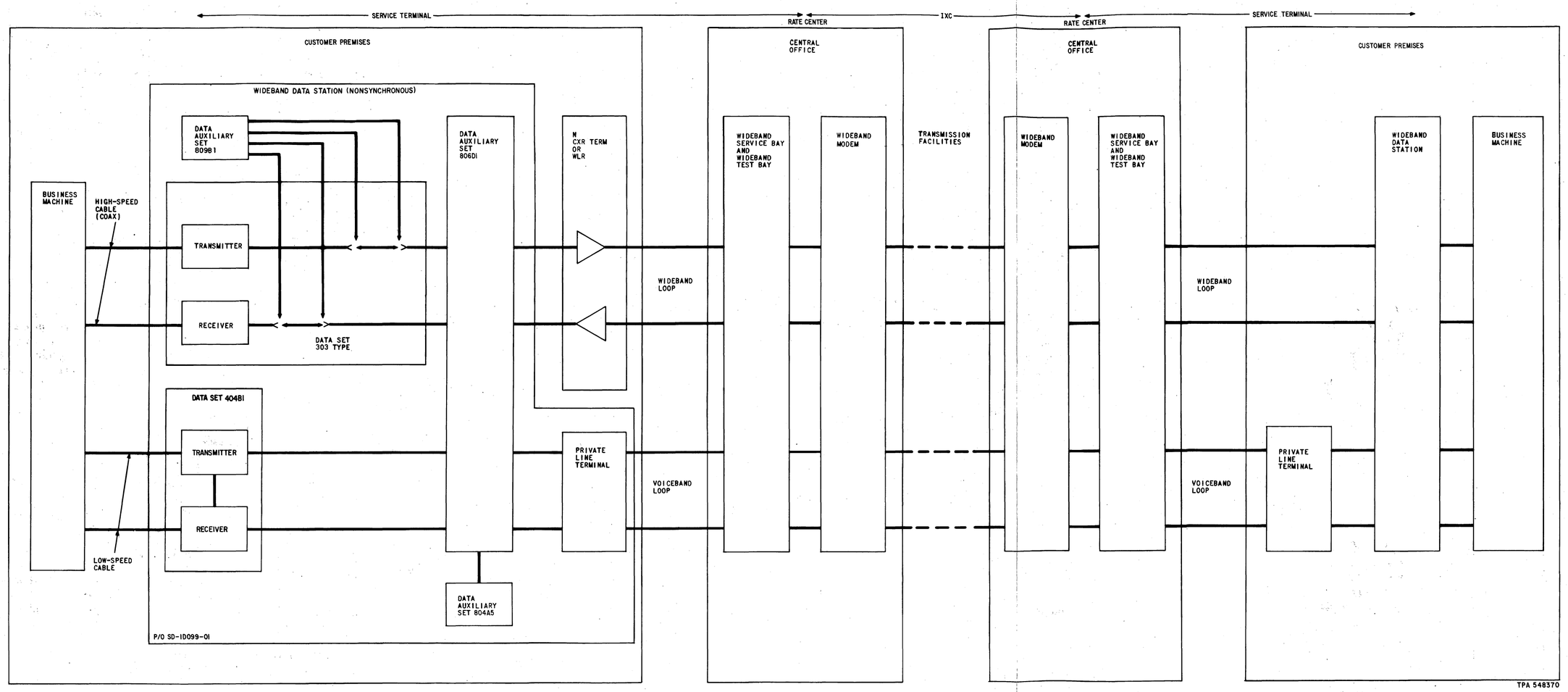

Fig. 1—Wideband Data System Restored Polar Line Signals

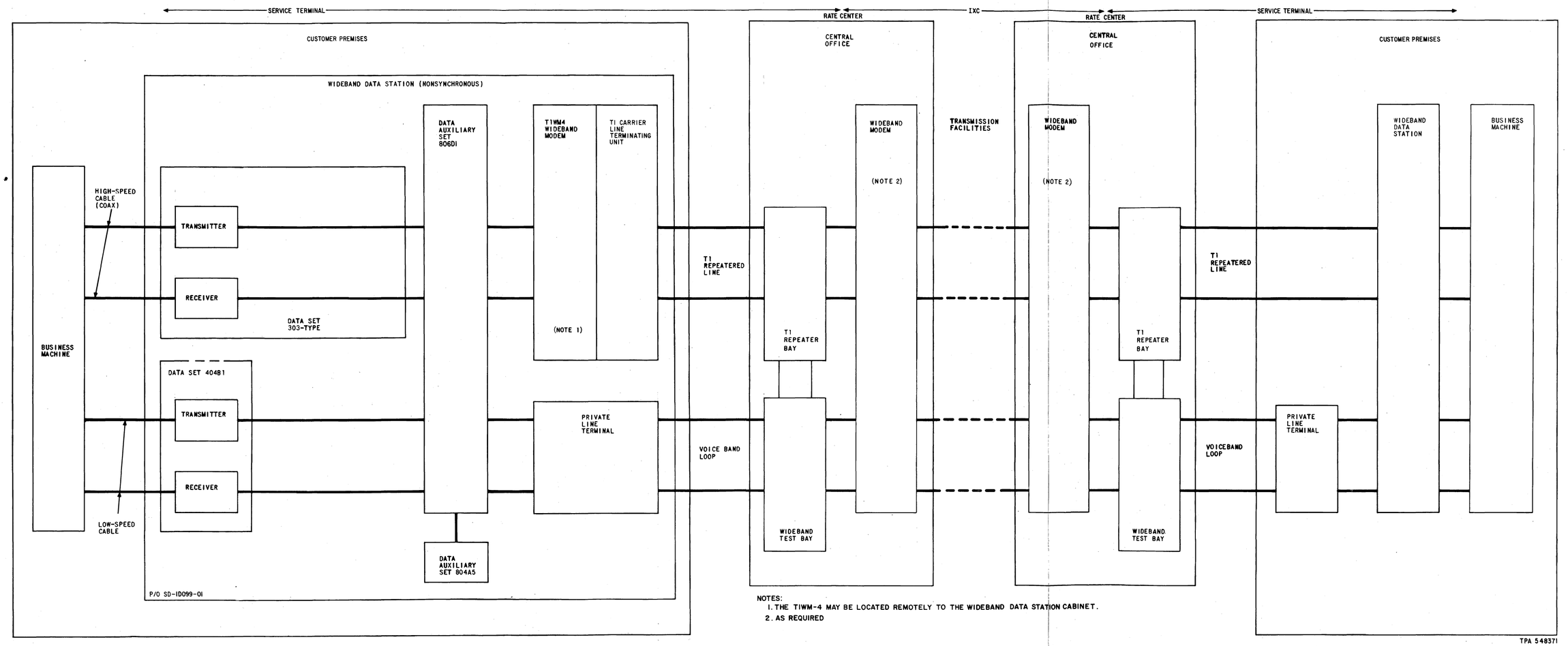

Fig. 2—Wideband Data System DC-Coupled Balanced Line Signals—T1WM4 Modem

TABLE B

DATA SET 303-TYPE SPEED DESIGNATIONS

CODE	SIGNALING RATE		FACILITY				
	NONSYNCHRONOUS – MINIMUM SIGNAL ELEMENT WIDTH	SYNCHRONOUS SPEEDS	HALF-GROUP	GROUP	SUPERGROUP	REPEATERED LINE	T1 LINE
303B	52 Microseconds	19.2 kbps	X			X*	X
303C	20 Microseconds	50.0 kbps		X		X	X
303D	4.3 Microseconds	230.4 kbps			X	X	X
303E	4.3 Microseconds	200.0 kbps			X	X	X
303G	20 Microseconds	40.8 kbps		X		X	X
303H	52 Microseconds	18.75 kbps	X			X*	X
303J	2 Microseconds	460.8 kbps					X

* Requires DAS 809B1 when used with an analog transmission system.

Data Auxiliary Set 806D1

5.17 Data Auxiliary Set 806D1 is a line terminating and test unit which provides the following features:

- ***Local Test***: Provides a means for looping the data station transmit line circuit to the receive line circuit to permit a check of the business machine through the data station on a local loop-back basis.
- ***Remote Test***: Provides a means for a test center to loop the facilities at the data station line interface so that transmission tests can be made over the facilities, and to loop the send data circuit inside the data set at the customers interface so that overall transmission tests can be made.
- ***Monitoring and Terminating Jacks*** provide access to the associated wideband line facilities.

5.18 For more detailed information, see Section 598-077-100, CD- and SD-1D217-01, and CD- and SD-1D218-01.

Data Auxiliary Set 804A-Type

5.19 The DAS 804A-type is a telephone instrument which provides for voice transmission over the voiceband coordination channel and the necessary control functions for the wideband data station.

5.20 The DAS 804A-type is equipped with six buttons:

- ***RING***—A non-locking button which, when depressed, initiates ringing to the far end or is used for recall.
- ***TEST***—A locking button which, when depressed, places the station in the local test mode.
- ***AUTO***—A locking button which, when depressed, enables the automatic answer feature.
- ***WB DATA***—This button is blocked. The associated lamp lights when the station is conditioned to process wideband data.
- ***TALK***—A locking button which, when depressed, places the data station in the talk mode. When the station is placed in

TABLE C

CODE MATRIX

UNBALANCED INTERFACE					BALANCED INTERFACE				
Nonsync		303B2 303C2 303D2	303J21		303C23		303B4 303C4	Nonsync	
Synchronous	Internal Transmit Clock	303B6A 303C6A 303D6A 303E6A 303G6A	303B25 303C25 303D25 303E25 303G25 303J25		303B27 303C27 303H27		303B8A 303C8A 303H8A	Scrambler*	Synchronous
					303B31 303C31 303H31		303B12 303C12 303H12	No Scrambler	
Line Filter		100% Roll-Off	None	Roof	None	Roof	100% Roll-Off	Line Filter	
Line Signal		Restored Polar	Balanced DC		Balanced DC		Restored Polar	Line Signal	

* All Data Set Codes shown are equipped with a DU16A1 Scrambler. Codes with "A" suffix were originally equipped with CPAR134 Scrambler and coded without the "A" suffix. These codes are now Manufacture Discontinued.

the talk mode, transmission of wideband data is prevented unless the simultaneous talk and data option is installed in DS 303.

- ***VB DATA***—A non-locking button which, when depressed, places the wideband data station in the data mode.

5.21 For more detailed information see Section 598-030-100 and CD- and SD-1D041-01.

Data Set 404B1

5.22 Some wideband facsimile stations require low-speed control functions in each direction in addition to the wideband channel. This capability is provided by the use of DS 404B1 on the voice-frequency coordination channel.

5.23 DS 404B1 is a nonintegrated, 4-wire voiceband data transceiver capable of transmitting and receiving a 2-out-of-10 multifrequency format. The transmitter accepts voltage signals from the connecting business machine and converts these to voice-frequency signals for transmission over the telephone line. The receiver converts these frequencies into voltage signals which are passed to the connecting business machine. DS-404B1 is capable of operating at a rate of up to 20 data-bearing characters per second. See Section 594-024-100 and CD- and SD-1D069-01 for more detailed information.

Wideband Loop Repeaters (WLR)

5.24 Wideband Loop Repeaters are used to condition local facilities for the transmission of wideband data. They may be located at the customer location (station), intermediate (loop), and terminal (CO).

5.25 The use of a WLR is dependent on the facilities and is specified by the Transmission Engineer. When a WLR is specified for use at

the station, it may be incorporated as part of the station arrangement and mounted in the cabinet (when practical) with the other components that comprise the wideband station. See Table D for more detailed information on the WLR and other wideband equipment.

Wideband Data Station Cabinet

5.26 The components which are combined to make up a wideband data station can be mounted in a KS-20018 Cabinet or on standard 19, 23, or 25-inch Bell System relay racks using the appropriate mounting brackets. The T1WM4 will mount only on the 23-inch relay racks.

5.27 The station may be equipped with a 590B (23-inch) or 591B (19-inch) panel which is used to distribute 117 vac power to the individual components.

5.28 A KS-20598-L1 ac outlet box must be used when the T1WM4 wideband modem and the T1 line terminating unit are mounted in the data station cabinet.

5.29 See Tables E and F and accompanying notes for mounting information.

5.30 For more detailed information, see Sections 463-140-100, 590-010-201, and 593-800-100.

6. OPTIONS

6.01 The following listing includes all of the options associated with the wideband data station using DS 303-type. These options can be provided as required for specific installations. Determination of specific options to be used is dependent on the particular station arrangement. Certain options must be used, others are dependent on the customer preferences.

6.02 The following options are available on DS 303.

- **A Option**—Permanent Nonsync—Required of all nonsynchronous data sets equipped with a balanced customer interface and factory-furnished in balanced interface sets. It may be used in nonsynchronous data sets equipped with an unbalanced customer interface rather than requiring the customer to supply an ON signal on the ALT lead.

- ***E Option***—External Transmit Clock—Previously factory-furnished in data sets with suffix 13, 14, 17, and 18. It must be supplied in synchronous unbalanced interface data sets when the customer supplies the transmitting clock. Do not use Z option when E option is provided.

- **J Option**—Sync Logic Normal—Factory-furnished in all synchronous sets and should be installed in all synchronous sets not equipped with Y option.

Note: J option must be removed if Y option is installed.

- **K Option**—This option, which is not factory-furnished, provides permanent line status indication. It must be used when DAS 804A-type is not used. This provides a permanent enabling signal [Line Status (LS)] to DS 303-type in absence of 804A.

- **M Option**—When this option is furnished, the scrambler idle code is not transmitted until RS is ON. It is factory-furnished with unbalanced interface data sets if a scrambler is supplied. Either the M or Q option must be supplied in all synchronous sets even if the scrambler is not used.

- **N Option**—When this option is installed, DS 303-type is in the data mode whenever ALT is OFF. This permits simultaneous voice communication and synchronous wideband data. When ALT is ON DAS 804A-type must be in the data mode to transmit wideband data.

- **Q Option**—When this option is installed, the scrambler idle code is transmitted whenever it is receiving a transmit clock. Either the Q or M option must be furnished in all synchronous data sets. It is factory-furnished in all synchronous data sets with a balanced interface.

- **R Option**—This option, necessary on multipoint nonswitched networks, is not factory-furnished and applies only to half group data sets. When it is installed the vestigial sideband (VSB) carrier is turned OFF when RS is OFF.

TABLE D

WIDEBAND EQUIPMENT

TYPE	BSP	ENGINEERING	J-SPEC	PRACTICE	DRAWING	DESCRIPTION
WSB	314-601-120		J70168 ( )	807-126-150	SD-73035	Application Schematic
WLR — 1&2	314-640-100	AB28.100.02	J70159 ( ) (A&M)	807-125-150	SD-73031	Schematic
					SD-73032	Application Schematic
WLR — 3	314-641-100	AB28.105.02	J70163 ( )	807-125-151	SD-73034	Schematic
					SD-50375	WSB Application Schematic
WLR — 4	314-642-100	AB28.105.02	J70171 ( )	807-125-152	SD-73051	Schematic
WLR — 5	314-643-100				SD-73035	WSB Application Schematic
WRR — 1	314-644-100		J70174 ( )		SD-73062	Schematic
					SD-73035	WSB Application Schematic
LWM — 1	356-400-100	AB28.100.04	J68868 ( )	804-640-156	SD-50373	Application Schematic
					SD-50374	Plug in Circuits
LWM — 2	356-405-100		J68880 ( )	804-640-157	SD-50867	Application Schematic
					SD-50827	Plug in Circuits
LWM — 3&4	356-410-100	AB28.104.XX	J68868 ( )	804-640-156	SD-50373	Application Schematic
					SD-50374	Plug in Circuits
LWM — 5	356-401-100	AB28.105.XX	J68880 ( ) (A&M)	804-640-157	SD-50652	Application Schematic
					SD-50653	Plug in Circuits
LWM — 6	356-402-100		J68880 ( )	804-640-157	SD-50804	Application Schematic
					SD-50805	Plug in Circuits
LWA — 1	356-411-100	AB28.100	J68868 ( )	804-640-156	SD-50459	Interconnection Schematic
N2WM — 1	362-811-100	AB28.100	J99272 ( )	801-431-150	SD-99712	Application Schematic
N2WM — 2	362-812-100					
					SD-97407	Application Schematic
N2WT — 1	362-812-100	AB28.100	J99272 ( )	801-431-150	SD-97403	Application Schematic
T1WB — 1&2	365-118-100		J98713 ( )	801-505-151	SD-97300	Application Schematic
T1WB — 3	365-120-100		J98713 ( )	801-505-151	SD-3C017	Application Schematic
T1WM — 1	365-119-100		J98713 ( )	801-505-151	SD-97284	Application Schematic
T1WM — 4	365-121-100		J98713 ( )	801-505-151	SD-3C067	Application Schematic

TABLE E

KS-20018

CABINET DIMENSIONS

CODE	LIST NO.	DEPTH (INCHES)	WIDTH (INCHES)	HEIGHT (INCHES)	WEIGHT (POUNDS)
KS-20018	L2	12	24	17	18
KS-20018	L3	12	24	24	24
KS-20018	L4	12	24	30	27.5

- **S Option**—The inverse of N option and permits simultaneous talk and nonsynchronous wideband data when ALT is ON. When ALT is OFF, DAS 804A-type must be in the data mode to transmit wideband data.

- **S and N Options**—When both S and N options are installed, DS 303-type can transmit either synchronous or nonsynchronous data independent of whether DAS 804A-type is in the talk or data mode. When neither the S nor N option is supplied, DAS 804A-type must be in the data mode to transmit wideband data. Note that when DAS 804A-type is not used, the K option must

TABLE F

WIDEBAND DATA STATION

MOUNTING HARDWARE

TYPE OF MOUNTING \ STATION APPARATUS	303-TYPE	809B	806D TYPE	404B	806D AND 404B	806D AND 806D*
	CODE OF MOUNTING BRACKETS REQUIRED					
#5 Crossbar-Type Frame (23″ Mtg. Plates)	87T†	87T†	87B	—	87C	87D
KS-20018-Type Cabinet (23″ Mtg. Plates)						
Bulb Angle-Type Frame (23″ Mtg. Plates)	87U†	87U†	87F	—	87G	87H
Bulb Angle-Type Frame (12″ Mtg. Plates)	87J	87J	87K	87L	—	—
KS-20093-Type Cabinet (25″ Mtg. Plates)	87W†	87M†	87N	—	87P	87R

* Indicates units mounted adjacent to each other in the same horizontal space. Two P46M668 brackets are used to fasten the two sets together.

† Indicates change to a new type of bracket used to accommodate the mounting of new power source outlet box for equipment in DS 303-type cabinets. The 87A, 87E, and 87M-type brackets are Manufacture Discontinued.

be supplied. Neither the N nor S option is factory-furnished in DS 303-type.

- **T Option**—When this option is supplied, a permanent RS indication is given to DS 303-type. This option, which is not factory-furnished, can be used rather than customer-supplied RS.

- **V Option**—Used to bypass DAS 809B1. It is factory-furnished in all group and supergroup data sets. It is needed with half-group sets if a vestigial sideband (VSB) unit is not used.

- **W Option**—This option, not factory-furnished, is necessary when DAS 806D-type is not used. It provides a "no remote test" and "no local test" indication to DS 303-type to open the transmit and receive gates in DS 303-type when DAS 806D-type is not used.

- **X Option**—This option, not factory-furnished, provides for scrambling with no descrambling.

- **Y Option**—This option, not factory-furnished, provides for descrambling with no scrambling.

Note: X and Y options are to be used only when one-way scrambling is necessary.

- **Z Option**—This option must be supplied when the transmitting clock is internal to DS 303-type. The E option must not be supplied when Z option is installed. Z option is factory-furnished where it is required.

6.03 The following options are available on DAS 806D1.

- **Z Option**—Used when data auxiliary set 804A type is not provided. This option provides operating voltage for line looping relays RT1A and RT1B; the voltage is otherwise obtained through circuits in data auxiliary set 804A type.

- **X Option**—Provides a 0-dB pad in the wideband transmit line; option Y provides 10 dB. Option X is used in data unit 32A1; option Y is used in data unit 32A2. These options are mutually exclusive. Option X must be used when option A is provided.

- **V Option**—Used in all 4-wire applications. This option (a) connects the 2800-Hz test detector to the receive voice line, (b) enables the operating path of relays RT1B and LTD associated with the voice line, and (c) provides a strap which completes a protection circuit in connecting data auxiliary set 804A1.

- **W Option**—Is provided for use with 2-wire voice coordination circuits. This option connects the 2800-Hz test detector to the transmit voice line (the line pair in a 2-wire case) and omits the enabling path to relays affecting the voice line. Options V and W are mutually exclusive.

- **S Option**—Used when the data terminal ready (DTR) signal is to be provided from the customer data terminal. This option must be used when the automatic answer feature is used in the associated data station.

- **T Option**—Provides a wired DTR signal. When option T is used, the customer does not provide the DTR signal, and the automatic answer feature cannot be used. Options S and T are mutually exclusive.

- **R Option**—Provides 600-ohm terminations for the transmit and receive voice lines. This option permits termination of the line when the voice coordination channel is not utilized.

- **ZH Option**—Provides means for connecting to the voice line transmission path in the data unit via connector J5. It is used when data auxiliary set 804M type is provided. When installed, this option connects the 4-wire circuit from data auxiliary set 804M type to data unit 32A type and also provides the ACU TALK IND path from the 804M.

- **J Option**—Provides a data path and answer-back tone path closure to complete these circuits through connecting data auxiliary set 804A type. This option is used in all applications involving data auxiliary set 804A type.

- **G Option**—Provides means for connecting the voice transmit path in the data unit to the voiceband data connector A.

- **A Option**—Provides a wideband transmission path through data unit 32A1 in which the

remote test and local test looping configuration is bypassed. The path does include line terminating and monitoring jacks. Option A is used when data unit 32A1 is part of data set 306 type. In this case, loop-back functions are performed in auxiliary line terminating equipment.

- **B Option**—Provides a wideband transmission path through data unit 32A type which includes the remote test and local test looping configurations. Option B is usually used when data unit 32A1 is part of data auxiliary set 806D1. Options A and B are mutually exclusive.

- **ZG Option**—Provides a contact closure to operate an external looping relay when the data unit is placed in the local test mode. It is used together with option A when data unit 32A1 is part of data set 306 type.

- **ZA Option**—Provides the operating path for the WB CHAN lamp in an associated data auxiliary set 804A type. This option is used when data unit 32A1 is part of data auxiliary set 806D1.

- **ZB Option**—Provides the path for the ACU TALK IND function when data auxiliary set 804A type is used.

- **ZC and ZD Options**—Provide the capability of simultaneous talking and transmission of wideband data when data unit 32A1 is used as part of data auxiliary set 806D1. Neither the ZC nor ZD option should be provided when this capability is not required as is the case when a voiceband data set is provided on the coordination channel. Option ZC should be used when the simultaneous talking and wideband data capability is required as a permanent arrangement. Option ZD should be used when control of this capability is from the alternate use signal (ALT) to an associated data set such as 303 type. Options ZC and ZD are mutually exclusive.

- **ZE Option**—Provides termination for the voice line when a voiceband data set is not provided to terminate an associated 804-type data auxiliary set operated in the data mode.

- **ZF Option**—Provides switching of the receive pair of a 4-wire full period point-to-point voice coordination line between voice and data circuitry under control of an associated data auxiliary set 804A1. This option is used when data unit 32A1 is part of data auxiliary set 806D1.

6.04 The following options are available on DAS 804A-type.

- **A Option**—Allows 804A5 and 804A7 units to be used with a data set which has ±12-volt power supplies.

- **B Option**—Connects R relay make contact to AUTO key to provide part of the operate path for the C relay in the automatic answer mode.

- **F Option**—Used to connect the TALK lamp to the T relay. When the station is in the talk mode, the lamp associated with the TALK key lights.

- **G Option**—In series with the AUTO ANS key and provides remainder of operate path for C relay in automatic answer mode. Used with the B option, it provides the automatic answer function for the data station.

- **H Option**—Provides a balanced pair on DT and DR instead of a single signal lead with a ground common.

- **J Option**—Used for 2-wire only service.

- **M Option**—Used when DAS 804A-type is operating on a 4-wire service.

- **N Option**—Ties the ring detecting circuit to cord leads Ring R and Ring T.

- **V Option**—Provides a 600-ohm line impedance.

- **W Option**—Provides a 900-ohm line impedance.

- **X Option**—Provides a 12 dBm level for answer-back tone at the line terminals.

- **ZA Option**—An installer option to allow use of the ±18 volt power supply in the data set.

- **ZK Option**—Not compatible with A option. This is provided when 4-wire private line stations are equipped with alternate switched network lines. It is required to provide correct operation when transferring from data to talk mode over switched network lines.

- **ZL Option**—Used as a compatibility option when DS 203 is used.

- **ZM Option**—Used when the DS 203 is not used.

6.05 The following options are available on DS 404B1.

- **W Option**—The W option provides full gain of the receiver.

- **X Option**—The gain of the receiver can be reduced by one-half by inserting a 6-dB pad.

- **Y Option**—The receiver can be arranged to terminate either a 600- or 900-ohm line. Y option provides 600-ohm operation.

- **Z Option**—Provides 900-ohm operation.

6.06 There are no options for DAS 809B1. When DAS 809B1 is used, R option may be installed in DS 303 (see 6.02).

7. WIDEBAND DATA STATION ARRANGEMENTS

7.01 The wideband data station is usually located at the customer premises. It provides the interface between the business machine equipment and the wideband data transmission system.

7.02 Depending on the interface furnished, Data Set 303-type can be used with:

- DAS 806D1
- DAS 804A-Type
- DS 404B1
- DAS 809B1
- T1WM4 Modem

7.03 The following are commonly used station arrangements. For more detailed information See CD- and SD-1D099-01.

Wideband Data—Without Voice Coordination (Fig. 3)

7.04 Data Set 303-type and DAS 806D are considered the minimum equipment for a standard DS 303-type wideband data station. The code of the DS 303-type is dependent on the features required.

7.05 In this arrangement the DS 303-type is arranged for continuous on-line operation. DAS 806D provides the necessary test capabilities for all the wideband station arrangement. DAS 809B1 is shown as an option.

7.06 The optional DAS 809B1 provides service for half-group operation with restored polar-type line signals (Fig. 1). When dc-coupled balanced line signals are used (Fig. 2), the DAS 809B1 is not required.

Wideband Data—4-Wire Coordination Channel (Fig. 4)

7.07 The Data Set 303-type, DAS 806D1, and DAS 804A-type are used in this arrangement. DAS 809B1 is shown as an option.

7.08 The DAS 804A-type requires a private line circuit on the voice frequency coordination channel. This private line circuit is mounted external to the wideband data station.

7.09 The optional DAS 809B1 provides service for half-group operation with restored polar-type line signals (Fig. 1). When dc-coupled balanced line signals are used (Fig. 2), the DAS 809B1 is not required.

Wideband Data (Equipped With Low Speed Data Set)—4-Wire Coordination Channel (Fig. 5)

7.10 This arrangement uses the Data Set 303-type, DAS 806D1, DAS 804A-type, and Data Set 404B1. DAS 809B1 is shown as an option.

7.11 This arrangement has the same features as that shown in Fig. 4, except for the addition of the low-speed data set. The addition of Data Set 404B1 provides the low speed data control functions.

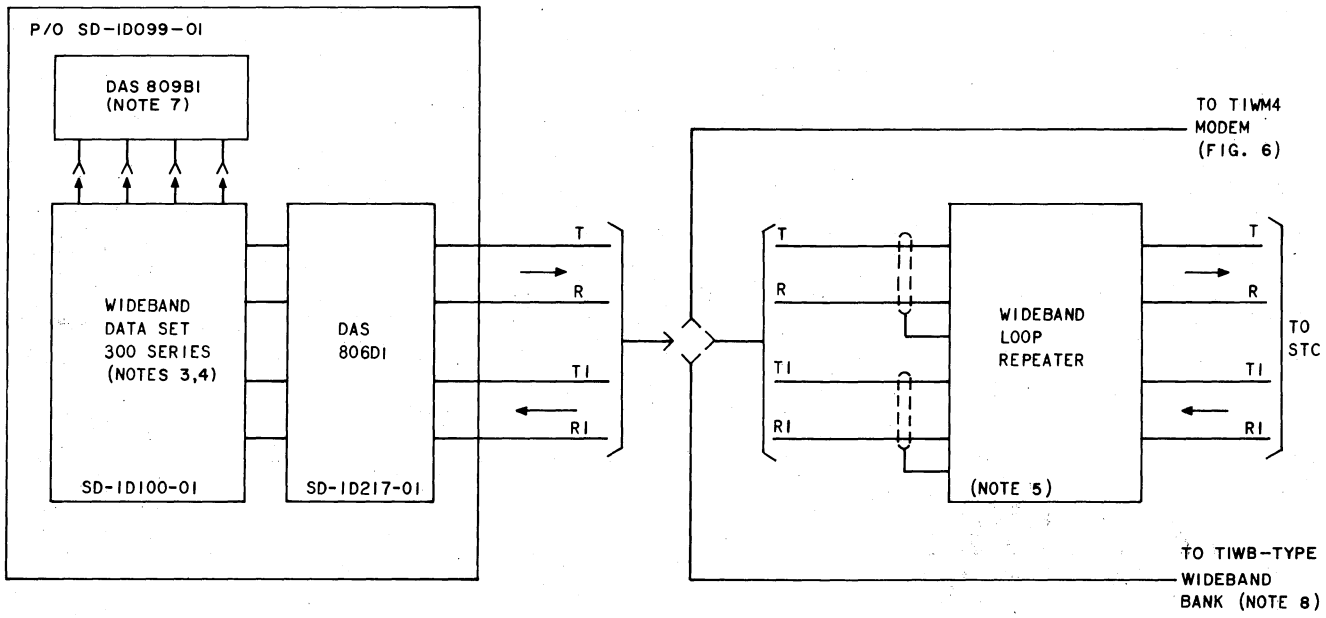

Fig. 3—Wideband Data—Without Voice Coordination

T1WM4 Wideband Modem (Fig. 6)

7.12 T1WM4 Wideband Modem can be used in conjunction with any of the previous arrangements. The Data Set 303-Type must be arranged for dc-coupled balanced line signals (Fig. 2).

7.13 The T1WM4 accepts serial binary signals from the Data Set 303-Type and converts the signals into a form suitable for transmission over T1 carrier facilities. The receiver portion of the T1WM4 performs the inverse by converting the T1 signals into a form suitable to Data Set 303-Type.

7.14 See Section 365-121-100 for a more complete description of T1WM4 and the Associated T1 Carrier Line Terminating Unit.

Data Auxiliary Set 809B1

7.15 Data Auxiliary Set 809B1 is optionally shown in Fig. 3, 4, and 5. It is used in conjunction with a 19.2 Kbps (or 18.75 Kbps in special applications) DS 303 to provide service over half-group wideband transmission facilities using L- or N-type carrier. When dc-coupled balanced line interface DS 303-type is used, DAS 809B1 is not required at the data station. For more detail information, refer to Section 314-608-100.

4-Wire Private Line Termination

7.16 The 4-Wire Private Line Termination used in Fig. 1, 2, 4, and 5 provides the necessary equipment for terminating the voiceband coordination channel and is arranged for 20 Hz simplex ringing.

7.17 See Section 593-800-200 for more detailed information.

24V4 Repeater

7.18 The 24VA Repeater used in Fig. 4 and 5 is shown as an option. It may be required on the voiceband coordination channel to meet specific transmission requirements.

7.19 For more detailed information, see Section 812-002-290.

8. REFERENCE INFORMATION

8.01 The following Sections, CDs (circuit descriptions), and SDs (schematic diagrams)

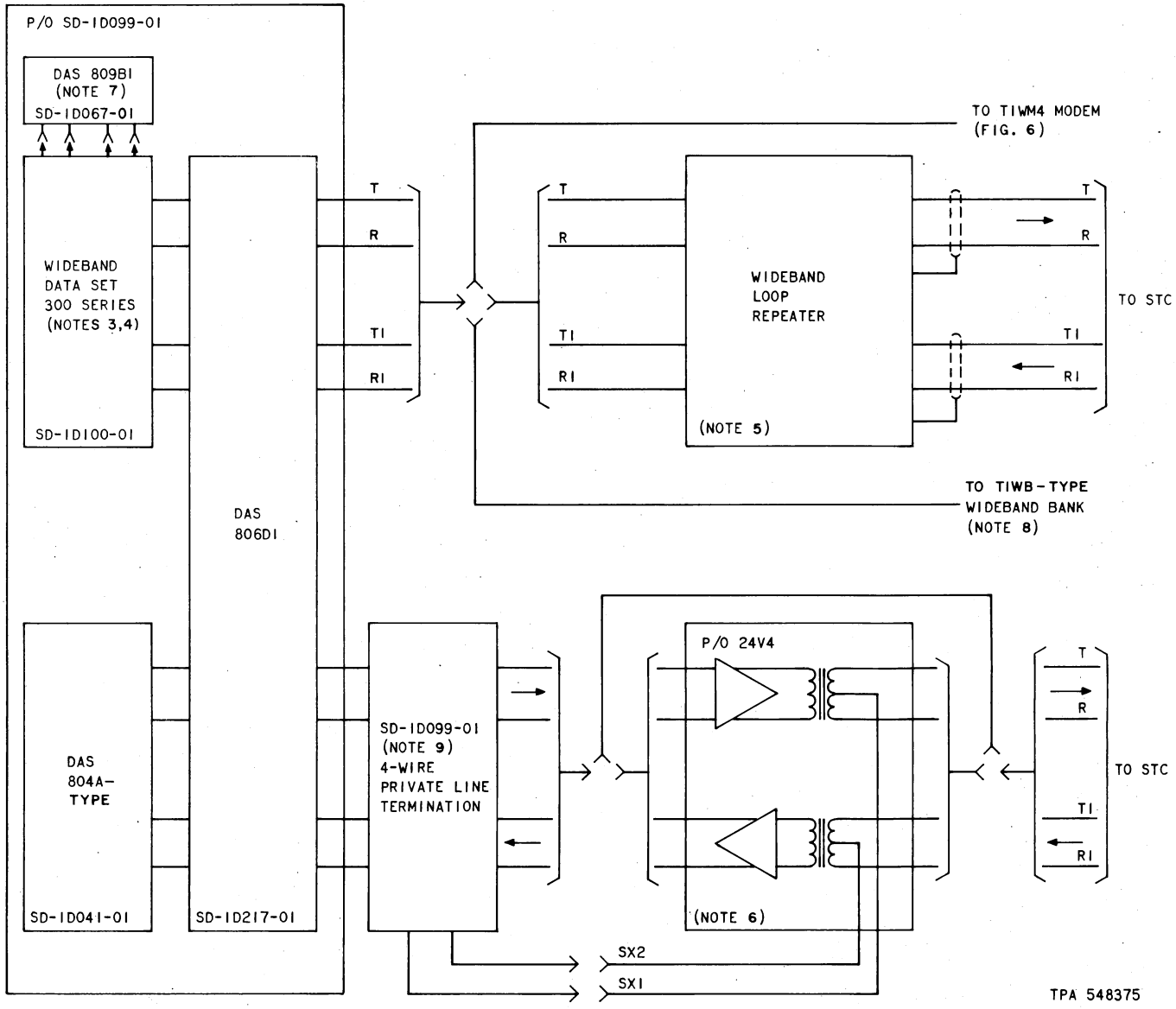

Fig. 4—Wideband Data—4-Wire Coordination Channel

will serve as an aid to those who desire more detailed information on the general subjects covered in this section. Titles are condensed and rearranged for use as a ready reference.

SECTION	TITLE
314-605-100	A2 (40.8 Kbps)
314-608-100	Half-Group Systems
314-609-100	Group Systems
AB28.100.XX	A2 (40.8 Kbps)
AB28.104XX	Half-Group Systems
AB28.105XX	Group Systems
AB28.106XX	Super-Group Systems
AB28.107	Application Engineering
AB28.178.1	Wideband Transmission Systems

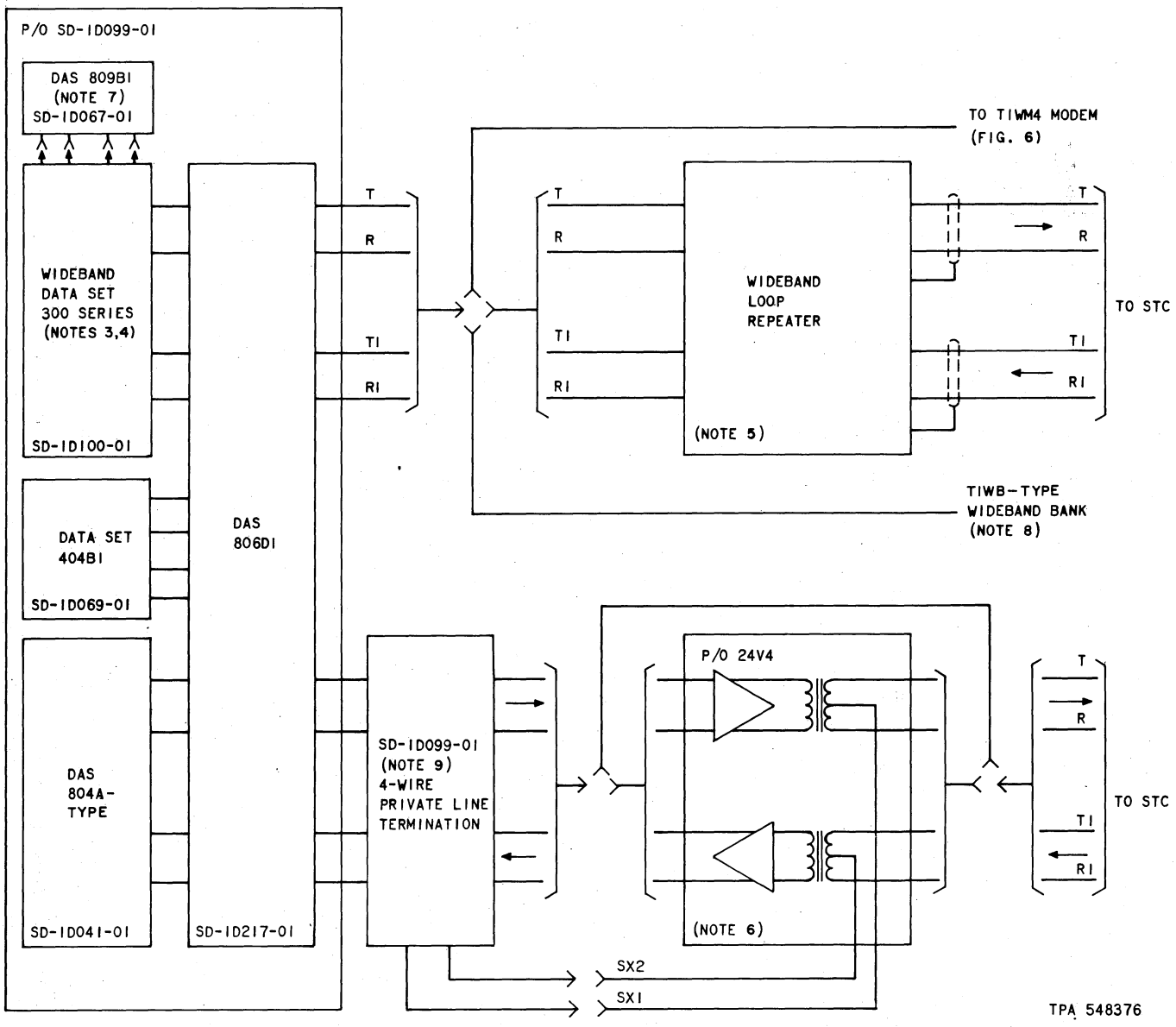

Fig. 5—Wideband Data (Equipped With Low Speed Data Set)—4-Wire Coordination Channel

590-XXX-XXX	Data Systems—General Information		Point-To-Point Private Line—Installation and Connections
593-012-100	Data Set 303-Type, Description	598-030-100	Data Auxiliary Set 804A-Type—Identification
593-800-100	Wideband Data Station Using Data Set 303-Type—Four-Wire Point-To-Point Private Line—Description and Operation	598-034-100	Data Auxiliary Set 809B1—Identification
593-800-200	Wideband Data Station Using Data Set 303-Type—Four-Wire	598-077-100	Data Auxiliary Set 806D-Type—Identification

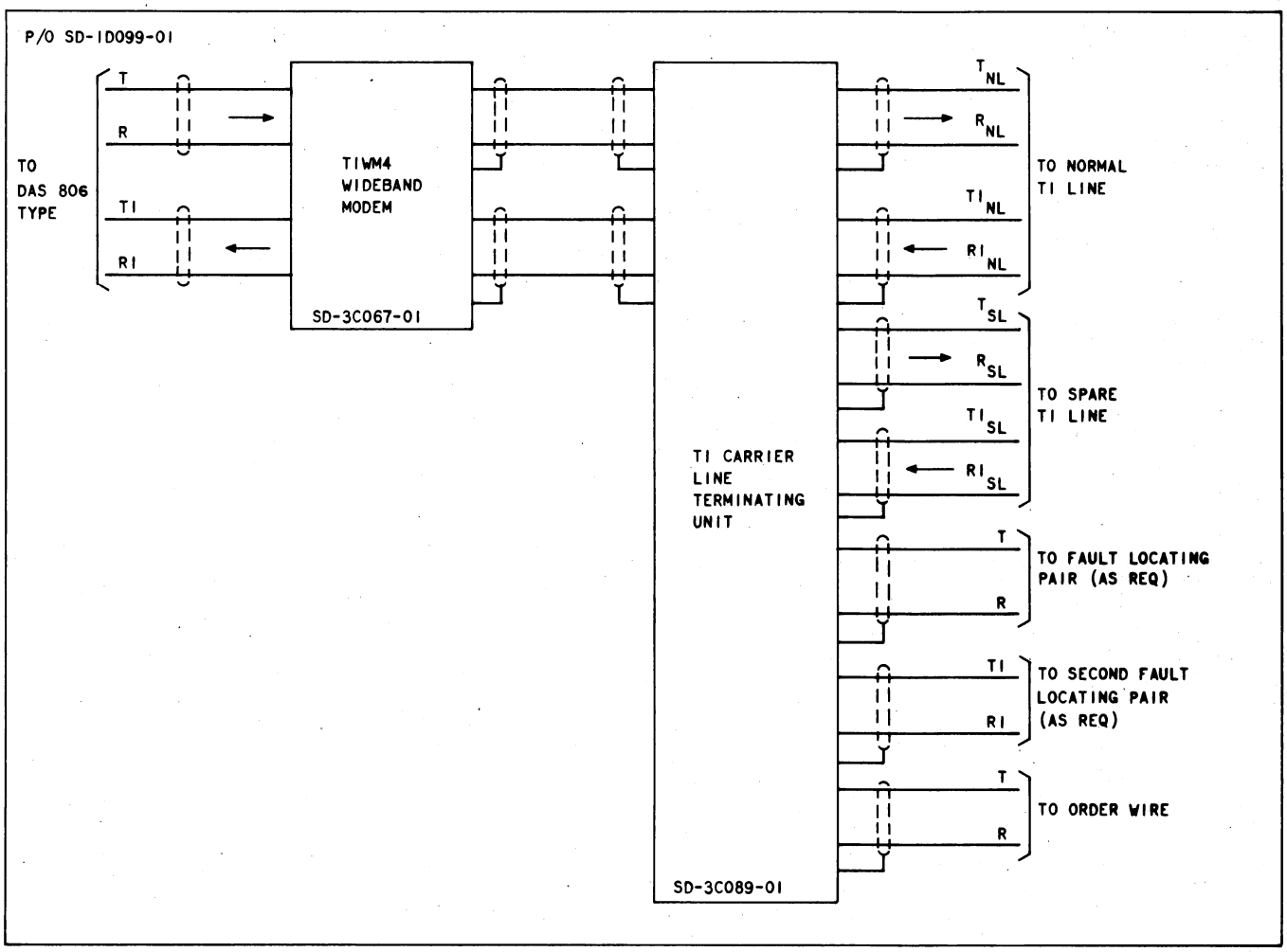

Fig. 6—T1WM4 Wideband Modem (Notes 10, 11, 12, and 13)

594-024-100	Data Set 404B1—Identification
SD-&CD-1D099-01	Data Station for Wideband Service Using Data Set 303-Type—Application Schematic
SD-&CD-1D100-01	Data Set 303-Type
SD-&CD-1D041-01	Data Auxiliary Set 804A1
SD-&CD-1D067-01	Data Auxiliary Set 809B1
SD-&CD-1D217-01	Data Auxiliary Set 806D1
SD-&CD-1D069-01	Data Set 404B1
SD-&CD-1D218-01	Data Unit 32A-Type Line and Test Unit
SD-&CD-3C067-01	Common Systems, T1 Carrier Special Data, T1WM4 Modem Application Schematic
SD-&CD-3C089-01	Common Systems, T1 Carrier Line Terminating Unit
SD-&CD-1D061-01	Typical Data Set Applications

9. PROJECT GUIDELINES

9.01 The following information describes the project team activities and procedures used in the provision of wideband data service. The

Intercompany Services Coordination (ISC) Plan provides a general guide in Section 010-520-136. This guide will cover these responsibilities and procedures in more specific detail.

9.02 Engineering will be involved in planning, implementation, or administration phases in providing a wideband service. Basically the goal of this department is to specify the best available combination of equipment, facilities, and design consistent with customer needs, by the most economical means.

9.03 The Engineering Control Office (ECO) bears the major responsibility for the ***planning phase*** of a wideband data service. This includes, but is not limited to:

- Determining Bell System capability to meet customer requirements
- Assisting in establishing feasible intervals
- Preservice counseling with sales and customer
- Initiating requests and coordinating efforts of various engineering groups, Western Electric, Associated, and Independent Companies to develop tentative system design and equipment procurement schedules.

9.04 The ***implementation phase*** covers all the Engineering effort involved in establishing the service. Specific responsibilities of team members are assigned prior to the issuance of the USSO. All critical dates, the project team members, and the implementation schedule should be on the USSO.

9.05 The ***administrative phase*** begins with the use of the service by the customer. In this phase, Engineering assistance may be requested by Sales or Operations personnel who are in direct contact with the customer. This assistance usually concerns the operation of the service.

9.06 Because of the requirement for close wideband data service coordination, a ***Project Team*** should be established by the ISC Control Team in accordance with Section 010-520-110 ***for each wideband data service ordered.*** This does not include minor modifications or changes.

9.07 To represent the Engineering Department, a Project Engineer should be appointed as described in Section 010-520-136. The engineer will normally be in the ECO (Customer Service branch).

Coordination

9.08 Prior to making a definite commitment to a customer desiring a wideband data service, the Sales Department will seek advice and assistance regarding intervals and procedures. Section 010-520-111 specifies that a Service Inquiry is "issued by Marketing in USSO format to determine information in advance of a firm customer order." If a firm order is in hand, the Project Team should be established and become involved in all pre-planning activities.

9.09 The Project Engineer will act as the Engineering member of the ISC Project Team and initiate and coordinate the required Engineering activities. The engineer will develop with the help of Plant Extension, Transmission Engineering, Operations, Western Electric, Associated and Independent Companies, a tentative system design and service interval including critical dates, based on customer needs.

9.10 A USSO, issued with a Date to Follow (DTF) when independent companies are involved, or Furnished Due Date (FDD), is issued when a firm order has been received from the customer. This allows equipment and facilities to be ordered immediately. (See Section 010-520-111.)

USSO

9.11 A firm USSO will be based on a firm date. All reservations and other action will be directed toward meeting that date.

9.12 The USSO, when issued, will list the ISC Project Team, including the Project Engineer as well as Marketing, Plant and Traffic (or Operations), and the Western Electric representative. Each member will have responsibility for coordinating all efforts within his own department.

9.13 Engineering Department responsibilities include the following by branches:

- Plant Extension—Facility Projects

- Facility search and assignment

- Project Sheet preparation

- Plant Extension—Equipment Projects

  - Central Office Equipment availability

  - Request for provision of additional equipment.

- Plant Design—Schedule and Coordination

  - Coordination with Western Electric (Engineering and Installation)

  - Scheduling information

  - Furnish status on requisitions and schedules.

- Plant Design—Equipment Engineer

  - Preparation and placing of order with Western Electric

  - Engineering of Installation.

- Circuit Layout

  - Circuit Orders to clear facilities

  - Circuit Order to establish wideband facility.

- Operating Company

  - Provision of local channel and facilities within territory

  - Provision of station equipment

  - Some functions in Associated Companies are assigned to the Plant Department or to bureaus operated jointly by Engineering and Plant personnel. Regardless of how the functions are handled or by whom, all required aspects remain as Engineering responsibilities and must be properly and fully coordinated.

Project Planning

9.14 As described in Section 010-520-110, the Project Team should develop a comprehensive project schedule and ensure adherence to it. The schedule should fit the requirements of the specific service.

9.15 The following describes different types of schedules used to meet the requirements for a specific service. The documents should be compatible with those recommended by Section 010-520-110 so that the documents will be compatible with Associated Companies and Long Lines.

9.16 Copies of the Project Schedule should be sent to all ISC Teams involved. The schedule will show the assignment of items as the responsibility of specific departments.

Project Schedule

9.17 The Project Team should develop a comprehensive Project Schedule. Fig. 7 shows an example of a control chart used to develop the objective interval required to complete the project in a given time.

9.18 The component intervals as well as the overall may vary from project to project if facilities are not available.

9.19 Fig. 8 shows an example of a Wideband Data Schedule used by one Long Lines Area. This form lists the objective completion date for each key activity, a column for listing the present view for any given date of publication, and a third column for the actual completion date of the item.

Programmed Evaluation and Review Technique (PERT)—Planning and Scheduling

9.20 Critical Path Methods (CPM) are a group of administrative tools which are frequently used. These methods provide a system of planning, scheduling, and controlling project-type work. One of these techniques, PERT, is adaptable to ISC planning and scheduling.

9.21 Fig. 9 is an example of a PERT plan for a Wideband Data Service Project. The PERT plan is accompanied by a chart analysis showing the activity, event, action taken, and interval in days.

9.22 The PERT chart would normally be drawn on a uniform graph with the horizontal axis representing elapsed days or weeks. Events represented by circled numbers would be correlated

with the proposed Project Scheduled. (See Section 010-520-110.) In the example, the time axis is compressed because of some long intervals indicated.

9.23 In the PERT chart, lines connecting events represent activities by Engineering to bring about the event or support it. The ***Critical Path,*** shown as a heavy line, is the primary or basic activity required to complete the project. The time interval between events on the Critical Path must be met. The sum of supporting activities connecting these Critical Path events can never exceed the Critical Path time allotment.

9.24 The decision to use PERT or other methods rests with the Project Control Team or Area.

Project Team Coordination

9.25 The Project Engineer, the Project Team, and the ISC Control Team share the responsibility for assuring that all involved are kept fully informed of project activities and status.

9.26 It is advisable to compile and maintain a complete Project Package throughout the life of the project. A typical Project Package will contain the following:

- Contact list of names, addresses, and telephone numbers of all persons involved in the Project.
- The Project Schedule and/or PERT chart.
- Correspondence and Project Sheets for equipment required, drawings common to all circuits, Western Electric Company coordination sheets.
- Individual circuit sections for all circuits involved in the project (including USSOs and supplements, Engineering Supplements sent, Engineering Information Reports received, specific circuit information, and circuit sketches).

9.27 Actual coordination activities often will begin during the pre-service planning phase of a project. The activities will continue through all the steps of implementation until the service is in and working. The PERT chart analysis accompanying Fig. 9 shows 28 events requiring 41 activities to bring a project to its completion. If any one of these activities fails to meet the objective date, the entire project might be placed in jeopardy.

9.28 Coordination must include close liaison between all parties involved and frequent status checks by the Project Engineer.

9.29 The following are activities which may be required and should be checked by the Project Engineer in connection with providing the service:

- Determining if special construction charges are applicable and reasonable, and obtaining estimated costs for the salesman if needed.
- Clearing FCC restrictions if necessary.
- Determining if use of ***Quick-Start*** packaged units is necessary. (See Engineering Letter 575 dated July 16, 1971.)

Quick-Start Packaged Units

9.30 The use of Quick-Start packages is intended to provide service on short interval orders where facilities can be established, but the permanent equipment for the service will not be available for the service in sufficient time for plant tests before the required service due date.

9.31 The Wideband Data Quick-Start units are not to be confused with ***installed spare*** central office equipment installed by Plant Extension Project in anticipation of future needs.

9.32 The Project Engineer should be sure that permanent equipment is on order before the use of Quick-Start packages is considered.

Implementation

9.33 Upon receipt of a USSO for wideband data service, the ECO must compile the service requirements, issue an Engineering Supplement, and initiate action to effect procurement of facilities, central office, station equipment, and loops for the service.

9.34 The Project Engineer, as the Engineering member of the ISC Project Team, is responsible for initiating and coordinating all engineering activities in the planning and implementation phases. The following summarizes major considerations in

WIDEBAND DATA COORDINATION CONTROL CHART

ISSUE NO. / KEY DATES	CIRCUIT NO.							
(A) – ACTUAL (F) – FIRM (T) – TENTATIVE	LOCATION	A						
		Z						

			INITIAL	CURRENT	INITIAL	CURRENT	INITIAL	CURRENT	INITIAL	CURRENT
USSO ISSUED										
CSE ENGINEERING ISSUED										
NARRATIVE EIR ISSUED										
LOOP MAKE UPS RECEIVED FROM ASSOC. CO.		A								
		Z								
REQ. DUE DATE	C.O. EQUIPMENT	A								
		Z								
	INTERMED. C.O. EQUIP.									
	LOOP EQUIPMENT	A								
		Z								
	STATION EQUIP.	A								
		Z								
WECO SHIP (LAST ITEM)										
FAC. CIRCUIT ORDER IN FIELD										
FACILITY TESTS (PTD)	CXR L.L.									
	CXR A.C.									
	LOOPS	A								
		Z								
CIRCUIT ORDER IN FIELD										
WECO COMPLETED										
CIRCUIT LINE UP START										
SERVICE DUE DATE										

Fig. 7—Wideband Data Control Chart

WIDEBAND DATA SCHEDULE

LONG LINES SERVICE ENGINEERING

USSO_____

ID_____ RD_____ DD_____

ACTION_____ TYPE SCV._____

CUSTMR _____

COORDINATOR _____

TEL. NO. _____

CIRCUIT NO.

_____

TERMINALS

(A)_____ (Z)_____

ACTIVITY DESCRIPTION	OBJECTIVE	PRESENT VIEW	ACTUAL
Circuit Engineering Complete			
Facility Projects Issued:			
This Area			
Other Area			
Assoc. Co.			
Equipment Orders Placed:			
(Central Office) This Area			
Other Area			
Assoc. Co.			
(Station Eqpt.) (A)			
(Z)			
WECO Ship Date:			
(Central Office) This Area			
Other Area			
Assoc. Co.			
(Station Eqpt.) (A)			
(Z)			
WECO Installation Complete:			
This Area			
Other Area			
Assoc. Co.			
Channel Group Sched. to CLM			
H.F. Circuit Order Issued			
Pvt. Line Ckt. Ord. Issued			
Plant Work H.F. Ckt. Ord.			
Plant Work P.L. Ckt. Ord.			
Plant Testing Complete			
Service			

Fig. 8—Wideband Data Schedule

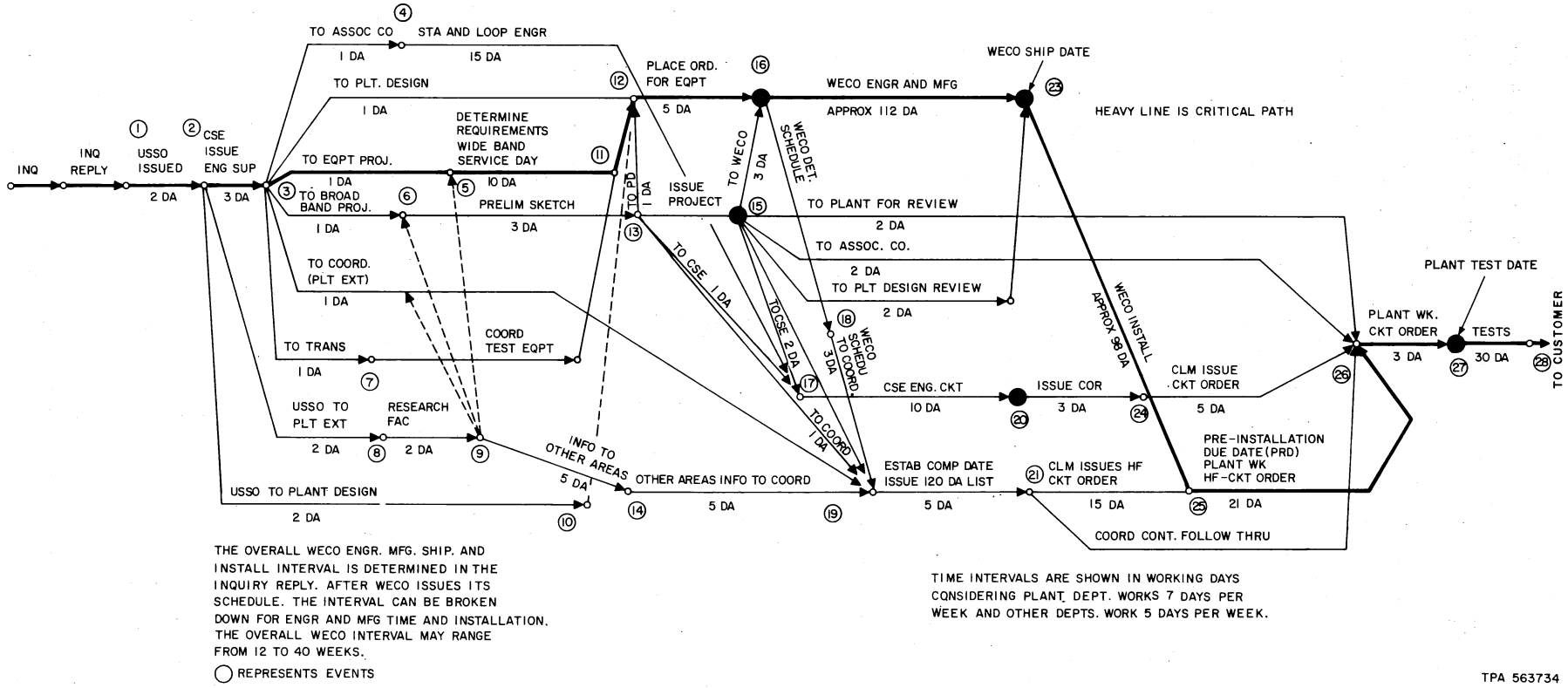

Fig. 9—Wideband Data PERT Chart

PERT CHART ANALYSIS

ACTIVITY	EVENT-EVENT	ACTION TAKEN*	INTERVAL (DAYS)
1	1-2	USSO Issured	2
2	2-3	CSE Issued Eng Sup	3
3	2-10	USSO To Plant Design	2
4	2-8	USSO To Plant Ext	2
5	3-4	Eng Sup To Assoc Co.	1
6	3-12	Eng Sup To Plt Design	1
7	3-5	Eng Sup To Eq Proj Eng	1
8	3-6	Eng Sup To BB Proj Eng	1
9	3-19	Eng Sup To Plt Ext	1
10	3-7	Eng Sup To TR Eng	1
11	4-17	Stn and Loop Eng	15
12	5-11	Determine Svc Bay Req	10
13	6-13	Prelim Sketch	3
14	7-11	Coord Test Eqpt	—
15	8-9	Research Facilities	2
16	9-14	Info To Other Areas	5
17	10-12	Eqpt Info To Ord Grp	—
18	11-12	Bay Reqmt To Ord Grp	1
19	12-10	Order Eqpt	5
20	13-12	Broadband Sketch To Plt Dsgn	1
21	13-15	Issue Project	8
22	13-17	BB Sketch To CSE	1
23	13-19	BB Sketch To Coord	1
24	14-19	Overall Info To Coord	5
25	15-16	BB Proj To WECO	3
26	15-26	To AC And Plt For Review	2
27	15-23	To Plt Dsgn For Review	2
28	15-19	BB Proj To Coord	2
29	15-17	BB Proj To CSE	2
30	16-18	WECO Determine Schedule	†
31	16-23	WECO Eng And Mfg.	112†
32	17-20	CSE Eng CKT	10
33	18-19	WECO Sched To Coord	3
34	19-21	Issue 120 Day List	5
35	20-24	Issue Cor	3
36	21-25	CLM Issue HF CKT Ord	15
37	23-25	WECO Install Eqpt	98†
38	24-26	Issue Colr	5
39	25-26	Pre-Installation Due Date — Plant Work HF CKT Ord	21
40	26-27	Plant Work CKT Ord	3
41	27-28	Test	30

* Underlined Activities are in Critical Path.

† The overall W.E.Co. engineering, manufacture and install interval is determined in the Inquiry reply. After W.E.Co. issues its schedule, the interval can be broken down for Engr, Mfg. time and installation. The overall W.E.Co. interval may range from approximately 12 to 40 weeks.

connection with the implementation phase of a wideband data service project.

- ***Facilities***—A Broadband Project Sheet usually must be issued by the Facility Projects Engineer of the area controlling the facility to establish a facility equipped with modems. The Engineering Supplement must specify the date the facility should be available for testing (usually about six weeks before the due date) to avoid the facility becoming available too late to allow for testing.

- ***Central Office Equipment***—The Engineering Supplement listing required equipment must be checked against availability in the Central Offices involved. The Equipment Projects Engineer may be involved where new Wideband Service Bays (WSB) or Wideband Data Test Bays (WDTB) are required. In such cases Equipment Project Sheets must be prepared and forwarded to the Equipment Engineers who place requirements with Western Electric. An advance completion date should be obtained to assure availability in time to meet the service Due Date.

- ***Station Equipment and Loops***—The Associated Company or Independent Company serving a customer location is responsible for facilities and equipment within its own serving territory as specified by the Engineering Supplement. Close liaison and coordination is required by the Project Team to assure that prompt action is taken to provide necessary equipment and facilities.

GENERAL FIGURE NOTES

1. The T1WM4 may be located remotely to the wideband data station cabinet.

2. Wideband Modem used as required.

3. See Tables B and C for information on Data Set 303-Type.

4. See Tables E and F for mounting information.

5. See Table D for reference information on WLR( ) when required.

6. When a 24V4 repeater is required on the 4-wire voice frequency coordination channel, see Section 812-002-290 for components required and selection of power unit.

7. Data Auxiliary Set 809B1 is required only in stations for half-group operation when providing service over half-group wideband transmission facilities using L or N carrier. The DAS 809B1 is not required when using dc-coupled balanced line signals.

8. When connecting to T1WB-type modem, see Table D for reference information.

9. See SD-1D099-01 for equipment required for the 4-wire private line termination. This equipment must be mounted in a cabinet separate from the wideband data station.

10. The T1WM4 and T1 Carrier line terminating unit may be mounted in the data station cabinet or remotely located. In this arrangement the line terminating unit is normally equipped with the 206A repeater and is powered from the modem. Other arrangements are possible and may involve different power considerations. These are covered in SD-3C067-01 and SD-3C089-01.

11. The T1WM4 Modem is used only with dc-coupled balanced line interface 303-type Data Sets. DAS 809B1 is not associated with such arrangements.

12. When T1WM4 is not mounted in the data station cabinet, cable distance from the data set must not exceed 1000 feet.

13. When the T1 Carrier line terminating unit is not mounted in the data station cabinet, cable distance from the T1WM4 must not exceed 750 feet.