10B DATA LINE CONCENTRATOR
SUMMARIZING SPECIFICATION
DATA SYSTEMS

1. GENERAL

Scope

1.01 This specification provides a listing of all apparatus which may be specified to provide a 10B Data Line Concentrator. In addition, a list of drawings, BSPs, test specifications, and other documents associated with this product is provided. This specification does not supply ordering information on other associated apparatus used in a Data Line Concentrator System such as computer port or station data sets.

1.02 The designation "10B Data Line Concentrator" is an ***identification code only*** and cannot be used to order or specify any of the component apparatus associated with the 10B Data Line Concentrator.

Description

1.03 The 10B Data Line Concentrator is designed to provide concentration of 2-wire station lines accessing computer ports in private line, multiaccess computer applications. A nonblocking ferreed switching matrix is used to provide metallic interconnections between station lines and trunks to computer ports.

1.04 The trunks can be divided into two groups; one group of trunks can be used to provide access to a primary concentrator, while the second group of trunks may provide access to an alternate computer. Only stations that are connected to the concentrator via dc facilities can be arranged to select both trunk groups.

1.05 The concentrator will recognize only signals generated by the data set 109 series. When the distance between the station and the computer is beyond the dc signaling range of these data sets, and other means of transmission are employed, interconnection circuits are required at the concentrator to convert to data set 109 type signals.

1.06 The concentrator is modularly constructed to be flexible in the number of lines and trunks that may be served, up to the full capacity of 128 lines and 32 trunks. The trunks can be divided into any ratio between the two trunk groups. The modules consist of data mountings equipped with circuit packs and apparatus mountings equipped with power supplies. The modules provide the switching network, supervisory functions, control functions, and power. Except when otherwise specified, the mountings, circuit packs, and power supplies are ordered separately. The following paragraphs describe each of the required modules.

1.07 ***Power Module:*** Two power options are available; one utilizes commercial ac power and the other utilizes a −48 volt dc source, normally found in central offices.

(a) ***AC Source:*** This module consists of a 71A Apparatus Mounting which may be equipped with up to four KS-20575, L1 Rectifiers.

(b) ***DC Source:*** This module consists of a 71B Apparatus Mounting which may be equipped with up to four J87308B Converters.

Both the rectifier and the converter provide +24 and −24 volts dc. When required, the rectifier can be arranged to provide either −48 or +48 volts dc instead of both +24 and −24 volts dc.

1.08 ***Control Module:*** The control module consists of a 23B1 Data Mounting which accepts the following circuit packs for concentrator control, alarm, and test functions.

(a) ***Clock:*** This circuit pack (AR489) contains the system clock and the trigger circuit which controls the ferreed switching network pulser.

(b) ***Camp-On Signal Generator:*** This circuit pack (AR597) generates a periodic signal to a camp-on bus common to all line circuits. The

signal is passed to stations awaiting service as a camp-on indication. A screw switch permits tailoring the signal for 75- to 110-, 150-, or 300-baud operation. The 75- to 110-baud option is connected at the factory.

(c) ***Pulser:*** This circuit pack (FP1) contains the pulsing transistor and its associated circuitry to operate the ferreed switching network under the control of the clock circuit pack. ***The FP1 circuit pack is supplied as part of the 23B1 Data Mounting.***

(d) ***Dual Access Trunk Scanner:*** This circuit pack (AR376) contains two counters, each capable of scanning 32 trunks under the control of the dual access control circuit.

(e) ***Dual Access Line Scanner:*** This circuit pack (AR383) contains two counters, each capable of scanning 128 lines under the control of the dual access control circuit.

(f) ***Dual Access Control:*** This circuit pack (AR377) contains the logic to operate the two line scanners, the two trunk scanners, the register and alarm circuits, and the pulse generator.

(g) ***DC/DC Converter:*** This circuit pack (AR381) contains a chopper regulator that converts +24 Vdc to +4.5 Vdc for use by the dual access trunk scanner, the dual access line scanner, and the dual access control circuit packs.

(h) ***Alarms and Registers:*** This circuit pack (AR490) detects malfunctions in a number of key circuits in the concentrator. They include line and trunk scanner, clock, and ferreed network pulser. Each detector has an associated alarm lamp on the card face. These alarms, along with system power failure, collectively control a master alarm relay which provides two sets of transfer contacts for remote alarm indications. The card also contains logic for driving two pairs of associated traffic registers (mounted separately on the 23B1 Data Mounting), one for call completions and the other for calls served out of the camp-on queue (for each trunk group).

(i) ***Manual Test:*** This circuit pack (AR464), along with an associated control box (Data Auxiliary Set 803E1), permits maintenance personnel to establish a connection between any line and any trunk for test purposes. Tip and ring of both line and trunk are available at the control box for continuity checks.

1.09 The control module is connected to each line and switch module using M50H Cords or double-ended A25D Connector Cables. In addition, the control module is connected to the trunk module with three 198B Adapters when the modules are vertically adjacent. When the control module is not vertically adjacent to the trunk module, interconnection is made with three M40A Cords and six 198B Adapters, one adapter for each end of the M40A Cord.

1.10 ***Trunk Module:*** The trunk module consists of a data mounting (21B1 or 22B1) which accepts trunk A circuit packs (AR488) and trunk B circuit packs (AR382). Each trunk circuit pack contains a single trunk circuit. The data mounting comes in two sizes; the 21B1 accepts up to 16 trunk circuits for use with the 8- or 16-trunk size line and switch module, the 22B1 accepts up to 32 trunk circuits and is used with the 32-trunk size line and switch module. Both modules accept trunk A circuit packs (AR488) in all positions and trunk B circuit packs (AR382) in positions 9 to 16 for the 21B1 Data Mounting and positions 17 to 32 for the 22B1 Data Mounting. Trunk circuit packs need only be supplied as required according to the number of trunks to be served. Interconnection between the trunk module and the control module is described in 1.08. The trunk module connects to a vertically adjacent line and switch module with 198B Adapters; when not vertically adjacent, M40A Cords and 198B Adapters are used.

1.11 ***Line and Switch Module:*** The line and switch module consists of a data mounting equipped with ferreed switches that make up the switching matrix and a housing which accepts up to 16 line circuit packs (AR366), each providing two line circuits. The data mounting comes in three sizes: 32 lines/8 trunks (18A1), 32 lines/16 trunks (19A1), 32 lines/32 trunks (20A1). Line and switch modules of the same trunk size can be connected together to obtain larger line groups. For example, two 32 lines/8 trunk modules, when joined, will serve up to 64 lines on eight trunks. A maximum of four such modules can be interconnected to serve up to 128 lines. It must be emphasized that line and switch modules with dissimilar trunk-group sizes cannot be interconnected. That is, a 32/8 is incompatible with a 32/16 or 32/32.

Having selected a trunk-group size (8, 16, or 32), the line size can be increased by adding similar modules, but to increase the trunk group (for example, from 16 to 32) the existing line and switch modules (as well as the trunk module) must be exchanged for larger units. The number of line circuit packs required is determined by the number of lines to be served; each line circuit pack accommodates two lines. Interconnection between adjacent line and switch modules, and between the first line and switch module and the trunk module is made using 198B Adapters. The number of adapters required to interconnect two modules is one, two, and four for the 18A1, 19A1, and 20A1 Data Mountings, respectively. If the modules are not vertically adjacent, then M40A Cords (with a 198B Adapter for each end of the cord) are required. The last line and switch module must be terminated by one (18A1), two (19A1), or four (20A1) 198A Adapters.

1.12 ***KS-20093, L1 Cabinet:*** The concentrator modules are designed to be mounted on 23- or 25-inch standard central office frames or in a cabinet such as the KS-20093, L1.

1.13 The KS-20093, L1 Cabinet provides front and rear mounting in a back-to-back arrangement of 25-inch relay rack equipment. A vertical mounting space of 68 inches is available, both front and rear. The cabinet is designed to be free standing on four adjustable levelers. Typical installation is on a false floor, such as found at a computer center where all cables are brought in through the open bottom of the cabinet. In the absence of a false floor, provision has been made to bring the cables along and through the top of the cabinet. This is accomplished by removing either one or both coverplates and installing a duct assembly, per KS-20093, L2, across the top of the cabinet. To complete the cabinet, a full door panel, KS-20093, L5, is required.

1.14 The data mountings are arranged for installation on 25-inch relay racks when shipped from the factory. By reorienting the mounting brackets on the data mountings, 23-inch racks may be used.

Power Requirements

1.15 Each concentrator module requires +24 and −24 volts dc. In addition, when the number of lines exceeds 32, the control module requires −48 volts dc. (See Note 1.) Both the KS-20575, L1 Rectifier and the J87308B, L1 Converter provide +24 and −24 volts dc. Both the rectifier and converter have a combined output capacity of 4.0 amperes. The rectifier requires an input of 115 watts of ac power held to 60 ±3 Hz at 105 to 129 volts ac. The converter requires an input of 185 watts of dc power between −44 and −50 volts dc. The number of converters or rectifiers required for each installation is given in Table C. A KS-20129 Power Strip may be installed in the KS-20093, L1 Cabinet to provide multiple ac duplex receptacles. Current drains are given in Table A.

> ***Note 1:*** When more than 32 lines are required, −48 volts dc must be applied to the control unit in addition to −24 and +24 volts dc. The −48 volts dc serves only to charge a 2800-μF capacitor in series with a 10-ohm resistor each time a connection is made.

1.16 ***Environment:*** The concentrator is designed to operate in an ambient temperature from 40 to 120°F with a relative humidity from 10 to 95 percent. Where the KS-20093, L1 Cabinet is used with natural convection, the interior temperature of the cabinet will rise approximately 4.0°F above ambient per 100 watts of interior power dissipation.

2. SUPPLEMENTARY INFORMATION

KS-20093—Cabinet and Accessories
KS-20129—Power Strip
KS-20575—Rectifier
X-17638—10B Data Line Concentrator
590-102-110—Identification—18A1 Data Mounting
590-102-111—Identification—19A1 Data Mounting
590-102-112—Identification—20A1 Data Mounting
590-102-113—Identification—21-Type Data Mounting
590-102-114—Identification—22-Type Data Mounting
590-102-119—Identification—23-Type Data Mounting
591-811-101—Description—10B Data Line Concentrator
591-811-201—Installation—10B Data Line Concentrator
591-811-301—Maintenance—10B Data Line Concentrator
591-811-501—Testing—10B Data Line Concentrator
598-075-100—Identification—Data Auxiliary Set 803E1
591-810-Series—10-Type Data Line Concentrator System
802-218-154—Power Systems, DC to DC Converter
AB27.426—Transmission Engineering Considerations—10-Type Data Line Concentrator System

TABLE A

CIRCUIT PACK CURRENT DRAINS

MODULE	CURRENT (mA)		
	+24 Vdc	−24 Vdc	+5 Vdc
Control Module (See 1.15, Note 1)			
AR381 Circuit Pack	400		
AR489 Circuit Pack	40	5	
AR383 Circuit Pack			650
AR376 Circuit Pack			520
AR377 Circuit Pack	10	2	325
AR464 Circuit Pack	320	10	
AR490 Circuit Pack	200	5	
AR597 Circuit Pack	35		65
Line Module			
AR366 Circuit Pack	45	5	
Trunk Module			
AR382 or AR488 Circuit Pack	45	10	

3. DRAWINGS

SD-1D212-01—Data Systems—Station—No. 10B Data Line Concentrator

4. PRODUCT

4.01 Summary of orderable apparatus and equipment to provide a 10B Data Line Concentrator. See Table B for codes.

18A1 Data Mounting—Wired assembly: capacity for 32 lines and 8 trunks; accommodates up to sixteen AR366 Circuit Packs (line circuit), per SD-1D212-01, App Fig. 7.

19A1 Data Mounting—Wired assembly: capacity for 32 lines and 16 trunks; accommodates up to sixteen AR366 Circuit Packs, per SD-1D212-01, App Fig. 8.

20A1 Data Mounting—Wired assembly: capacity for 32 lines and 32 trunks; accommodates up to sixteen AR366 Circuit Packs, per SD-1D212-01, App Fig. 9.

21B1 Data Mounting—Wired assembly: capacity for 16 trunks; accommodates up to sixteen AR488 Circuit Packs, or up to eight AR488 and eight AR382 Circuit Packs, per SD-1D212-01, App Fig. 3; compatible with 18A1 or 19A1 Data Mounting.

22B1 Data Mounting—Wired assembly: capacity for 32 trunks; accommodates up to thirty-two AR488 Circuit Packs, or up to sixteen AR488 and sixteen AR382 Circuit Packs, per SD-1D212-01, App Fig. 4; compatible with 20A1 Data Mounting.

23B1 Data Mounting—Wired assembly: accommodates control Circuit Packs AR381, AR489, AR597, AR383, AR464, AR376, and AR377, per SD-1D212-01, App Fig. 1.

71A Apparatus Mounting—Mounting assembly: accommodates up to four KS-20575, L1 Rectifiers, per SD-1D212-01, App Fig. 11.

71B Apparatus Mounting—Mounting assembly: accommodates up to four J87308B, L1 Converters, per SD-1D212-01, App Fig. 13.

Data Auxiliary Set 803E1—Provides manual test features: used with

AR464 Circuit Pack, per SD-1D212-01, App Fig. 17.

AR366 Circuit Pack—Provides two line circuits: used in 18A1, 19A1, and 20A1 Data Mountings, per SD-1D212-01, App Fig. 10.

AR376 Circuit Pack—Provides trunk scanners: used in 23B1 Data Mounting, per SD-1D212-01, App Fig. 1.

AR377 Circuit Pack—Provides control features: used in 23B1 Data Mounting, per SD-1D212-01, App Fig. 1.

AR381 Circuit Pack—Converts +24 Vdc to +4.5 Vdc for use by circuits on AR376, AR377, and AR383 Circuit Packs; used in 23B1 Data Mounting, per SD-1D212-01, App Fig. 1.

AR382 Circuit Pack—Provides trunk circuit for group B: used in 21B1 and 22B1 Data Mountings, per SD-1D212-01, App Fig. 6.

AR383 Circuit Pack—Provides line scanner: used in 23B1 Data Mounting, per SD-1D212-01, App Fig. 1.

AR464 Circuit Pack—Provides manual test features in combination with DAS 803E1: used in 23B1 Data Mounting, per SD-1D212-01, App Fig. 16.

AR488 Circuit Pack—Provides trunk circuit for group A: used in 21B1 and 22B1 Data Mountings, per SD-1D212-01, App Fig. 5.

AR489 Circuit Pack—Provides system clock and pulser trigger: used in 23B1 Data Mounting, per SD-1D212-01, App Fig. 1.

AR490 Circuit Pack—Provides alarms and traffic register circuits: used in 23B1 Data Mounting, per SD-1D212-01, App Fig. 2.

AR597 Circuit Pack—Provides camp-on signal: used in 23B1 Data Mounting, per SD-1D212-01, App Fig. 1.

FP1 Circuit Pack—Provides pulser for switch network: ***supplied with 23B1 Data Mounting,*** per SD-1D212-01, App Fig. 1.

198A Adapter—Terminates last line and switch module, per SD-1D212-01, App Fig. 5 and 6.

198B Adapter—Required to interconnect modules, per SD-1D212-01, App Fig. 1, 7, 8, and 9.

J87308B, L1 Converter—Converts −48 Vdc to +24 and −24 Vdc: mounts on 71B Apparatus Mounting, per SD-1D212-01, App Fig. 15.

KS-20575, L1 Rectifier—Converts commercial 60-Hz, 115-Vac power to +24 and −24 Vdc: mounts on 71A Apparatus Mounting, per SD-1D212-01, App Fig. 13.

M50H Cord—Used to interconnect control module with each line and switch module: equipped with KS-16785, L8 Plug (center fed) at both ends; stocked in 3-, 6-, 9-, and 12-foot lengths, per SD-1D212-01, App Fig. 7, 8, and 9.

A25D Connector Cable—Equipped with KS-16689, L3 Plug (end fed): available single ended to provide connections from line and switch module and trunk module to line and trunk loop circuits at distribution frames; stocked in 13-, 20-, 22-, 24-, and 26-foot lengths, but available in any length specified, per SD-1D212-01, App Fig. 3, 4, 7, 8, and 9; available double ended to interconnect control module with each line and switch module; stocked in 3-, 6-, and 9-foot lengths, per SD-1D212-01, App Fig. 7, 8, and 9.

A25C Connector Cable—Equipped with KS-16785, L8 Plug (center fed): available single ended to provide connections from line and switch module and trunk module to loop circuits at distribution frames; available in any length specified, per SD-1D212-01, App Fig. 5, 6, 8, 9, and 10.

M40A Cord—Used with two 198B Adapters to interconnect vertically nonadjacent modules, per SD-1D212-01, App Fig. 15.

4.02 ***KS-20093 Cabinet and Accessories***

List 1—Cabinet.
List 2—Duct Assembly: used when cables must be brought in through top of cabinet.
List 5—Door panel, full.

KS-20129 Power Strip—Mounts vertically inside KS-20093, L1 Cabinet; provides multiple ac duplex receptacles.

5. GENERAL NOTES

5.01 It is recommended that one each of the following circuit packs be stocked as maintenance spares.

AR489—Clock

FP1—Pulser

AR383—Line Scanner

AR376—Trunk Scanner

AR597—Camp-On Generator

AR377—Control Circuit

AR488—For Every Five Group A Trunks, Trunk Circuit A

AR382—For Every Five Group B Trunks, Trunk Circuit B

AR381—DC/DC Converter

AR490—Alarms and Register (Optional)

AR464—Manual Test (Optional)

AR366—For Every Five Lines, Line Circuit

5.02 In addition, it is recommended that one KS-20575, L1 Rectifier be stocked as a spare.

TABLE B

AUTHORIZED CODES

CODE	RATING	NO. REQD
18A1 Data Mounting 19A1 Data Mounting 20A1 Data Mounting	AT&TCo Std	Up to 4 of one type. See Table C
21B1 Data Mounting 22B1 Data Mounting	AT&TCo Std	1 of one type. See Table C.
23B1 Data Mounting	AT&TCo Std	1
71A Apparatus Mounting 71B Apparatus Mounting	AT&TCo Std	1 of one type.
AR366 Circuit Pack	AT&TCo Std	1 per 2 lines.
AR376 Circuit Pack	AT&TCo Std	1
AR377 Circuit Pack	AT&TCo Std	1
AR381 Circuit Pack	AT&TCo Std	1
AR382 Circuit Pack	AT&TCo Std	1 per B trunk.
AR383 Circuit Pack	AT&TCo Std	1
AR464 Circuit Pack	AT&TCo Std	*
AR488 Circuit Pack	AT&TCo Std	1 per A trunk.
AR489 Circuit Pack	AT&TCo Std	1
AR490 Circuit Pack	AT&TCo Std	1
AR597 Circuit Pack	AT&TCo Std	1
Data Auxiliary Set 803E1	AT&TCo Std	*
198A Adapter	AT&TCo Std	See Table C.
198B Adapter	AT&TCo Std	See Table C.
A25D Connector Cable (double ended) or M50H Cord	AT&TCo Std	One type as required. See Table C.
M40A Cord	AT&TCo Std	†
A25C Connector Cable (single ended) or A25D Connector Cable (single ended)	AT&TCo Std	One type as required.
J87308B, L1 Converter or KS-20575, L1	AT&TCo Std	One type as required. See Table C.

* One set (AR464 Circuit Pack plus DAS 803E1) can be shared among concentrators installed at the same site, otherwise one set required per concentrator.

† Required only when modules are not vertically adjacent. See 1.08 and 1.10.

TABLE C

EQUIPMENT REQUIREMENTS FOR VARIOUS SIZE CONCENTRATORS

LINES SERVED (UP TO):	TRUNKS SERVED (UP TO):	TOTAL VERTICAL RACK-SPACE REQD (INCHES)*	DATA MOUNTING REQD FOR LINE & SWITCH MODULE (NO. REQD)	DATA MOUNTING REQD FOR TRUNK MODULE	198A ADAPTER	198B ADAPTER†	M50H CORDS OR A25D CONN CABLES	AR366 CKT PACKS (LINE CKTS)	AR488 CKT PACKS (MAX.) (TRUNK CKTS A)	AR382 CKT PACKS (MAX.) (TRUNK CKTS A)	KS-20575, L1 RECTIFIER OR J87308B, L1 CONVERTERS
32	8	29	18A1 (1)	21B1	1	4	1	16	8	4	1 or 1
64	8	38	18A1 (2)	21B1	1	5	2	32	8	4	3 or 2
96	8	47	18A1 (3)	21B1	1	6	3	48	8	4	3 or 2
128	8	56	18A1 (4)	21B1	1	7	4	64	8	4	3 or 2
32	16	35	19A1 (1)	21B1	2	5	1	16	16	8	1 or 1
64	16	50	19A1 (2)	21B1	2	7	2	32	16	8	3 or 2
96	16	65	19A1 (3)	21B1	2	9	3	48	16	8	3 or 2
128	16	80	19A1 (4)	21B1	2	11	4	64	16	8	3 or 2
32	32	48	20A1 (1)	22B1	4	7	1	16	32	16	1 or 1
64	32	70	20A1 (2)	22B1	4	11	2	32	32	16	3 or 2
96	32	92	20A1 (3)	22B1	4	15	3	48	32	16	3 or 2
128	32	114	20A1 (4)	22B1	4	19	4	64	32	16	3 or 2

* Does not include clearance allowances for: guide pins (1 inch), 198A Adapters (2 inches), or hood of M40A Cord (4 inches). See Section 591-811-201.

† Numbers given assume modules are vertically adjacent. See 1.08 and 1.10.