

POLLABLE DATA TERMINAL—2A (PDT-2A)
DETERMINATION OF QUANTITIES
SMALL OFFICE NETWORK DATA SYSTEM (SONDS)
OPERATIONS SUPPORT SYSTEMS

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1. GENERAL

1.01 This section furnishes the traffic engineer with the information necessary for ordering a Pollable Data Terminal-2A (PDT-2A) for the Small Office Network Data System (SONDS) application. The limitations and capacities of the PDT-2A are also covered.

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

1.03 The title of each figure contains a number(s) in parentheses which identifies the paragraph(s) in which the figure is referenced.

1.04 The PDT-2A is a microcomputer controlled data collection terminal. The PDT-2A satisfies the need for a flexible data terminal for traffic and administrative data collection in smaller offices. In the SONDS application the PDT-2A meets the Electronics Industry Association (EIA) interface specifications.

2. HARDWARE DESCRIPTION

2.01 The PDT-2A is a self-contained unit requiring connections to -48 volt power, office alarms, scan inputs and data links. The main unit is on an 8 inch mounting plate designed for mounting on a 23 inch frame, and has a capacity of 640 scan inputs. Optionally, a second supplementary 8 inch mounting plate may be ordered, increasing the capacity by an additional 1920 scan inputs. For more detail see Section 252-118-101.

2.02 Space should be provided for a data set (113DR-type recommended) and mounting. The set itself is normally ordered via a company service order. (This assures maintenance of the set by the data services personnel of the operating company.) The recommended data set mounting is a KS 20018-L9D shelf.

2.03 The scan points are furnished in groups of 64 inputs per circuit pack with 10 circuit packs (numbers 0-9) in the main unit and 30 circuit packs (numbers 10-39) in the supplementary unit. The maximum number of scan points is 2560 (64 scan points × 40 circuit packs).

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A. Control Unit

2.04 The control unit is on a circuit pack (SL4) which controls scanning, processing, data storage, input/output processing, and maintenance tests. See Section 252-118-101 for more detailed information.

2.05 The microprocessor scans the inputs in blocks of eight. Therefore, the input type (ie, peg counts or usage) must be identical for each block of eight input terminals. For example, if input "0" is assigned as peg count, scan inputs 1 to 7 will also be scanned as peg count. Input assignments are made by the computer.

2.06 The control unit provides a standard EIA RS-232C communication interface. The data link interface leads are compatible with 103J, 113DR, or 212A data sets. Communications data rates are firmware controlled and the three most common rates are provided (110, 300, and 1200 baud). Only the 300 baud rate is used with SONDS.

B. Scan Unit

2.07 The scan unit contains the input filters and circuitry necessary to monitor the input signals and the multiplexing circuitry necessary to connect the scan unit output signals to a common data bus. The scan unit is modular. For more detailed information see Section 252-118-101.

3. ASSIGNMENT MAPPING

3.01 The Interactive Map Assembly Program (IMAP) is an interactive program which provides a means of generating a software "map" for the PDT-2A. For more detailed information see Section 190-514-020. Through IMAP the assignments of the measured equipment are made for each specific PDT-2A application (ie, SONDS, Engineering and Administrative Data Acquisition System [EADAS], etc). Figure 1 shows a suggested SONDS/PDT-2A Assignment Work Sheet. This document, when completed, serves as an input source for the IMAP.

3.02 The SONDS/PDT-2A scan inputs and registers are associated by the software "map." The engineer's responsibility is to provide an assignment of the type and quantity of equipment to be measured and to identify the type of register (ie, peg count or usage). These assignments are designated on the SONDS PDT-2A Assignment Work

Sheet. The engineer is not required to specify the scan inputs by number designation.

3.03 When this assignment information is entered into the IMAP program, it produces a "map." The "map" can be stored on a local storage medium such as a cassette magnetic tape to enable the user to load the PDT-2A. The PDT-2A is loaded at the completion of the PDT-2A installation test.

3.04 An office job record (ie, a TXXXX-482 office drawing) of the assignments can be produced. This office job record is used for Western Electric (or local) cross-connection of the central office equipment to scan the PDT-2A inputs. In order to do this, cross-connection information is added to the previously generated record of input assignments by using the Western Electric (WE) shared time terminal and the 482 drawing functions of the IMAP program.

3.05 The assignment data are provided by the Telephone Company (TELCO) engineer to the Regional Western Electric Line Engineer for processing by using the IMAP program functions on Western Electric's shared time system. The assignment data are provided at normal job intervals prior to job installation on a regular engineer, furnish, and install (EF&I) order.

3.06 However, the TELCO engineer has the option of generating the data base and 482 drawing as well as the "map" by using the IMAP program functions. In order to do this, the engineer must obtain an identification number and a password from the PDT-2A project coordinator. For details, see Section 190-514-020.

4. FUNCTIONAL DESCRIPTION

4.01 The SONDS/PDT-2A, as programmed for the SONDS application, may have scanning functions for 1 second usage, 10 second usage, and peg counts. These functions are assigned to the inputs in groups of eight and each group of eight is dedicated to the same type function (ie, usage or peg count) as mentioned in paragraph 2.05. Normally, the IMAP program assigns the PDT-2A inputs.

4.02 Each SONDS PDT-2A installation has its own unique "map" for the assignment of inputs from the office equipment to the output registers.

A. Scan Inputs

4.03 Of the 2560 inputs possible with the PDT-2A, only 400 inputs may be assigned to peg counts. Scan points are assigned in groups of eight by the IMAP program. Each group can be either usage (1 second or 10 second) or peg count.

B. Registers

4.04 SONDS output registers may be either accumulating or peaking (ie, the registration retained is the highest hourly value over a measurement period).

4.05 In making the assignments to the work sheet, the user should assign one accumulating register labeled "CYCLE COUNT." This register with this exact label is recognized and assigned the user designated register number by the IMAP program. The CYCLE COUNT register does not use a scan point and is incremented by the PDT-2A software once every 10 seconds. The contents of this register can then be checked by the SONDS computer when the output registers are read from the PDT-2A, thereby providing a check on the PDT-2A scanning operation. ***It is strongly recommended that a CYCLE COUNT register always be assigned,*** preferably as the last accumulating register in the series, as this helps to simplify the data analysis job for the network administrator.

4.06 The PDT-2A can provide a maximum of 2560 output registers; at present SONDS permits a maximum of 200 registers. The output registers for the SONDS application are numbered consecutively from 0 through 199 and may be assigned to function as either accumulating or peaking registers. However, it is necessary that numerically all accumulating registers be assigned before any of the peaking registers, ie, the highest numbered output register assigned to function as an accumulating register must be lower than the lowest numbered output register assigned to function as a peaking register.

4.07 When making register assignments to the work sheet, it is recommended that room for accumulating register growth be allowed. This can be done by leaving some unassigned registers

before the last assigned accumulating register CYCLE COUNT. For offices equipped with Automatic Number Identification (ANI), two or three registers should be left unassigned. For offices that are not equipped with ANI, seven or eight registers should be left unassigned. This is the only place in the assignments where spare registers should be provided. Spare registers are always printed out as zeros.

4.08 More than one data source may be assigned to a particular output register.

4.09 A somewhat different situation occurs when a particular data source is assigned to more than one output register. This is termed a "multiple assignment" because a scan input(s) will be required to score in more than one output register. In order to accommodate this requirement, the secondary register assignment table is generated for the PDT-2A by the WE computer. This table is discussed in Section 190-514-020.

4.10 The secondary assignment table contains blocks of output registers involved in these multiple assignments. The size of the secondary register assignment table must be equal to or less than 300 entries. One entry is defined as the occurrence of an output register in the table. The number of entries in the secondary register assignment table is found by counting all the registers involved in multiple assignments. Those assignments in which the combination is repeated are excluded. For example, if registers 1, 3 and 5 are assigned to component number 1 and are also assigned to component number 2, the count of multiple registers is 3 not 6 because of the repeated combination. If however, the same register(s) appears in two or more different combinations, then the register(s) is counted in each combination. For example, if register 3 is assigned in the combination 1, 3, 5 and also in the combination 3, 2, 6, then the number of multiple registers assigned is 6 (ie, register 3 is counted twice). The above can be summarized by saying that if more than one register is assigned to the component(s), the assignment is multiple registers and if the combination differs from other multiple assignments, all the registers in that assignment are counted. The following is an additional example for further clarification.

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If the assignments were:

	PEAK REGISTERS	ACCUMULATING REGISTER
Component 1	25, 26	12
Component 2	26, 27	
Component 3	26	
Component 4	26, 25	12
Component 5	27	12
Component 6		12

Multiple register assignments are components 1, 2, 4 and 5. Total multiple registers are 10.

The IMAP program will verify that this table has 300 or less entries. If more than 300 multiple registers are detected, the IMAP program will terminate data base generation.

4.11 Note that when assigning peg count items, the maximum number of scan inputs is 400.

5. TRAFFIC ORDER

5.01 The PDT-2A is ordered using the PDT-2A questionnaire E-8173. A sample of the type of assignment form in the questionnaire is shown in Fig. 1. These assignment forms become the IMAP program input document as discussed in paragraph 3.01. The assignments are made on the work sheet by listing the description of the equipment group to be measured and the number of items of equipment and associating them with a particular register. The register is also identified as peaking or accumulating.

5.02 Form E-8173 is submitted to the Regional Western Electric Engineer with the equipment

specification for input to the IMAP program. The output from the IMAP program is then used for job installation.

5.03 Figure 2 shows a PDT-2A capacity work sheet. This work sheet may be used to complete the number of input cards and registers required.

6. SUMMARY OF PDT-2A CAPACITIES

6.01 The following is a summary of the PDT-2A capacities.

(a) *Inputs:*

- (1) Maximum of 2560 scan inputs
- (2) Maximum of 400 PC scan inputs
- (3) Scan inputs are in multiples of eight by type (ie, peg count, 1-second usage, 10-second usage)
- (4) Total of 64 scan inputs per card.

(b) *Registers:*

- (1) Maximum of 200 pollable by SONDS
- (2) Maximum of 300 multiple registers
- (3) Cycle count register required.

Figure 2 is a work sheet for estimating these capacities.

AS E81730	S0000	SECTION *F*(PDT-2A ASGN WORKSHEET)						
RD E81730	S0100	STATUS	DATA SOURCE	NBR OF	PDT-2A		POLLABLE	
RD E81730	S0200	(A-ADD)		SCAN	REGISTER NO.	REGISTER NO.	DATA	
CD E81730	S0300	(C-CHANGE)		INPUTS			TERMINAL	
RD E81730	S0400	(D-DELETE)		SCAN			NO. 2A	
CD E81730	S0500			RATE				
RD E81730	S0600		First Selector	5	PC	1		ASSIGNMENT
CD E81730	S0700							WORKSHEET
RD E81730	S0800		Outpulser 1 st Trial	1	PC	2,7		FOR
CD E81730	S0900							()
RD E81730	S1000		Outpulser 2 nd Trial	1	PC	3,7		APPLICATION
CD E81730	S1100							
RD E81730	S1200		Outpulser Failure	1	PC	4,7		LOCATED IN:
CD E81730	S1300							OFFICE NAME
RD E81730	S1400		ANI-Plant Test Calls	1	PC	5		()
CD E81730	S1500							OFFICE BASE NO.
RD E81730	S1600		ANI-OPR Ident. Calls	1	PC	6		()
CD E81730	S1700							
RD E81730	S1800		All Finders Busy LG1	1	1 Sec		13	ASSOCIATED WITH:
CD E81730	S1900							CONTROL GROUP NO.
RD E81730	S2000		All Finders Busy LG2		1 Sec		14	()
CD E81730	S2100							LOCATED IN:
RD E81730	S2200		All Finders Busy LG3		1 Sec		15	OFFICE BASE NO.
CD E81730	S2300							()
RD E81730	S2400		Line Group Usage LG1		10 Sec		16	
CD E81730	S2500							
RD E81730	S2600		Line Group Usage LG2		10 Sec		17	PDT-2A
CD E81730	S2700							IDENTIFICATION
RD E81730	S2800		Line Group Usage LG3		10 Sec		18	NO. ()
RD E81730	S2900							
RD E81730	S3000		Connector Usage 74XX		10 Sec		19	PDT-2A
CD E81730	S3100							TELEPHONE
RD E81730	S3200		Connector Usage 75XX		10 Sec		20	NUMBER:
CD E81730	S3300							()
RD E81730	S3301		Connector Usage 76XX		10 Sec		21	
RD E81730	S3302							
RD E81730	S3303		Reverting Call Trunks		PC	8	22	
CD E81730	S3304							
RD E81730	S3400		CAMA ANI		10 Sec		23	
CD E81730	S3500							
AD E81730	S3600							

Fig. 1—PDT-2A Assignment Work Sheet (3.01, 5.01)

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SCAN INPUTS (from E-8173 assignment sheet)

TYPE	NUMBER REQUIRED	NUMBER TO ORDER (NOTE 1)	REMARKS
Peg Count		(a)	Capacity exceeded if number to order is greater than 400
1 Second Usage		(b)	
10 Second Usage		(c)	
Total (a) + (b) + (c) = (d) =			Capacity exceeded if total is greater than 2560

Note 1: "Number to order" is the "number required" rounded up to the nearest multiple of 8.

Total Input Cards Required = (d) ÷ 64 = _____ (rounded up)
(Note 2)

Note 2: If total cards is greater than 10 order supplementary card mounting.

REGISTERS (from E-8173 assignment sheet)

Total Registers Required = _____ must be 200
or less

Total Multiple Registers = _____ must be 300
or less

Cycle count register 24 hour = 1
Cycle count register accumulating = 1

Fig. 2—PDT-2A Capacity Work Sheet (5.03, 6.01)