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Title:

A Survey of TELEDATA Terms.

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RCSL No: 21-T017
Edition: Maj 1978
Author: Jens Henriksen

Keywords: RC8000, Teledata.

Abstract: This manual describes briefly the RC8000 data-processing concepts and terms which are of relevance to the Teledata system. The description covers software as well as hardware, and reference is made to specific manuals for detailed directions for use.

English edition: 26 pages.

Printed by A/S Regnecentralen, Copenhagen

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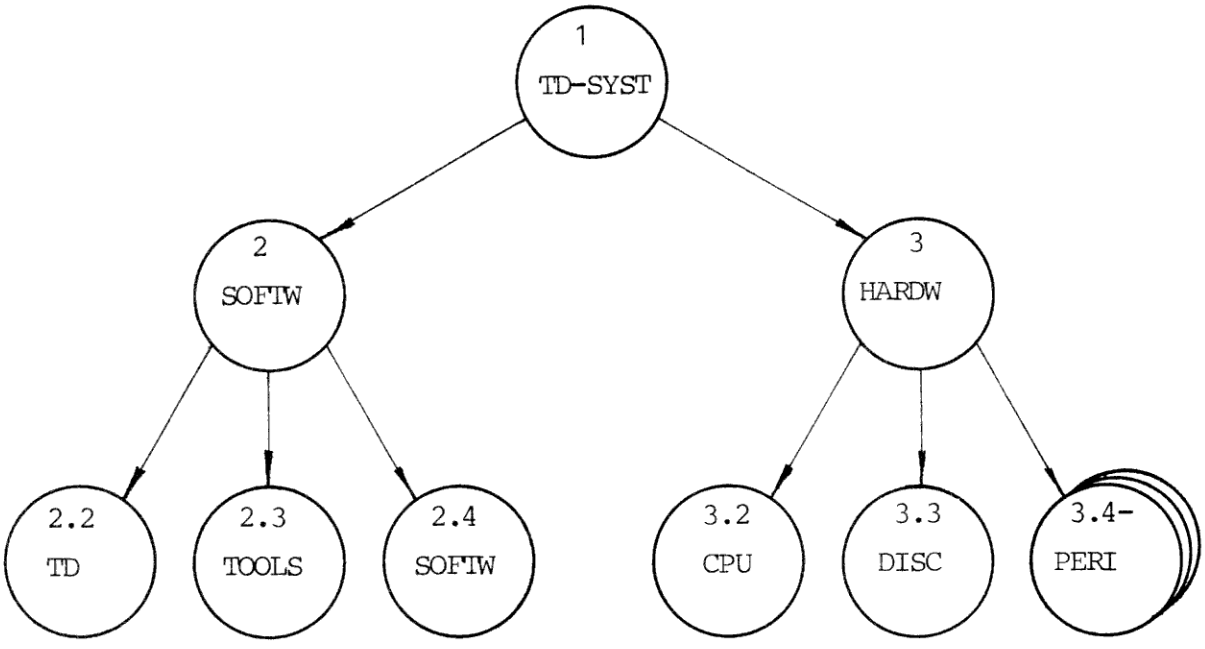
1. Introduction

This manual is intended as a glossary for the RC software and hardware items normally involved in a Teledata configuration.

Each item is described briefly, so as to give an idea of the purpose and usage in connection with a Teledata package. Furthermore reference is made to relevant manuals to be consulted for detailed information and directions for use.

Software and hardware are dealt with in Chapters 2 and 3, respectively, according to the illustration below.



Part of a complete Teledata product specification.

2. Software

2.1 General

The breakdown of the software structure is made from the point-of-view of the Teledata application system, i.e. starting with the Teledata application program, and then, step by step, penetrating deeper into the more basic layers of software, such as software tools, programming languages, operating system, and finally the monitor.

2.2 Teledata

Three groups of programs are specific to the Teledata system:

- The application modules
- Teleop, control program
- Teledata utilities

2.2.1 Teledata application modules

Teledata applications are programmed in the interpretative language DUET, supported by the SODA and DB80 database management systems. As seen from a user point-of-view, the Teledata application modules comprise two parts:

- an online part divided into a fixed part, the so-called Skeleton Program, and a variable part, usually identified as the adaption or model.
- a batch part to be used after close down of the online system.

2.2.1 Teledata application modules

The Teledata online program is a comprehensive general purpose administrative processing system including modules for

- invoicing
- inventory control
- debtor/creditor control
- order processing
- account entry

2.2.1.1 Skeleton program

This part contains the general logic including database access, whereas the user dependent part is controlled by the adaption part of the program.

The interface between the general and the user dependent parts is defined as exits from the Skeleton Program into the adaption modules.

The Skeleton Program contains a large number (more than 100) of well-defined and documented exit points, where the user may add his modules to satisfy his particular requirements. Please see the TELEDATA Vers. 3 Skeleton Program Manual, Vol I, II, and III, RCSL: 21-T006.

2.2.1.2 Adaption

The adaption modules perform the user dependent processing of the Teledata on-line applications, interfaced to the Skeleton Program as described above (2.2.1.1). Adaption modules are specific with regard to terminal users, i.e. each terminal user may have his own set of adaption modules, to which the access is controlled by the system via the user identification key, so that inadvertent access to other users' processing modules is avoided.

2.2.1 Teledata application program

The Teledata package contains a standard set of adaption modules, the so-called model solution. The purpose of this model is to provide a complete Teledata application system, and in many cases this model can be used without any changes; in other cases minor changes have to be made, or in the worst case the model only illustrates how it could be done (for educational purposes). RCSL: 21-T012.

2.2.1.3 Batch modules

The batch modules contains facilities for making daily reports based on the transactions processed during an online run.

The facilities are included in the model solution.

2.2.2 Teleop control program

Teleop is a control module, containing interpreters for the DUET and SODA DBMS languages. It activates the Skeleton Program for each transaction, performing

- initializations before the call,
- logging during the execution of the online program and
- updating of statistical information, cleaning up, and so on after the online program has processed the transaction.

Generally speaking, Teleop takes care of the connection with the "outside world", such as file system and the terminal handler.
RCSL: 21-T002.

2.2.3 Teledata utilities

The Teledata system includes a number of utility programs for normal run-time control, safety-copying, reestablishing, file checking, etc. RCSL: 21-T008.

2.2.3.1 Teleadm

The utility program Teleadm controls routine running of the Teledata system by activating command files and fp files (see fp description below) and evaluating the result after each command file has been terminated. If the execution of a command file terminates with an OK result, the next command file in the normal sequence is activated. In case of an erroneous result, automatic error recovery procedures are executed, or the original command file is repeated, depending on the type of the erroneous command file.

2.2.3.2 Telerees

The utility program Telerees will, by merging, reestablish a database from an earlier version (safety-copy) and the reestablishing log. It performs all insertions, deletions, and updatings for transactions up to the one which was being processed when the break-down occurred.

2.2.3.3 Telereproc

The utility facility Telereproc (which is a certain call of Teleop) will, by reprocessing the logged transactions, reestablish the database.

2.2.3 Teledata utilities

2.2.3.6 Teletape

The utility program Teletape handles the tape catalog, and is either used alone for updating and printing the tape catalog, or as a procedure, TELETAPR, called by other programs when accessing the catalog.

2.2.3.7 Telestatus

The utility program Telestatus updates and prints the Teledata status file.

2.2.3.9 Telemove

The utility program Telemove performs moving of disc files, very much like the standard utility program MOVE, but extended with facilities particularly suited to Teledata. In connection with the moving, checksums are controlled, the entry tail is copied, and the filesize is adjusted to the portion actually used (written segments).

2.2.3.11 Teleclock

Performs manipulations on the system Shortclock, inserts it in catalog entry tails, checks clock entries in several files for consistency, etc.

2.2.3.13 Telereadcf

The utility program Telereadcf is used to check the database files. All chains must be readable, and the number of list records in the chain is compared to what is expected by the application program.

2.2.3 Teledata utilities

2.2.3.15 Telecleancf

The utility program Telecleancf is used to clean up the database for marked records, i.e. the application program marks records no longer to be used, and they are subsequently deleted in the next run with Telecleancf.

2.2.4 Teledata post processing

In order to provide different kinds of post processing - daily reports as mentioned in 2.2.1.3 and communication to batch systems - the package includes facilities to extract information from the log and the database. RCSL: 21-T008.

2.2.4.1 Telelogex

Telelogex provides user-specific extraction and reformating of records from the log.
The program is implemented in DUET and, by means of facilities in DB80 and SODA, the fixed online DB description and the user-specific 'batch' DB description are merged.

2.2.4.2 Teledbex

Teledbex - which is similar to Telelogex - provides user-specific extraction from the online database.

2.3 High-level general software tools

This section describes general software tools for administrative data processing which operate on specifications one level higher than the normal programming languages ALGOL, FORTRAN, COBOL, etc. Consequently, most of these tools are in turn implemented in ALGOL. The greater part of the tools were developed independently of the Teledata system, and as such they are very useful (and are used indeed) for implementation of other administrative systems.

2.3.1 DUET programming language

DUET is an interpretative programming language with a compiler and an interpreter, the latter often referred to as the DUET machine. The present DUET version has been improved, so as to facilitate programming of real-time transaction processing systems, meaning that errors in one user's module or modules will have little or no effect on other users of the same software package.
Ref. DUET, RCSL: 21-V032.

2.3.2 Data base system

The data base system comprises 4 subsystems,

- cf system (connected files)
- DB80 (database description)
- SODA (local data description)
- utilities

2.3.2 Data base system

2.3.2.1 Cf system

Although Teledata does not use the cf system directly, it might be useful to become acquainted with the cf principles of operation. Three elements are fundamental to the cf system:

- master files (indexed sequential files)
- list files (sequentially accessed file, where the records are organized in chains)
- lists that enable a record in one file to act as a mother record for records in another file (daughter records).

Ref. Connected files system, RCSL: 28-D5.

2.3.2.2 DB80

DB80 is the data definition language used to describe the entire database, i.e. the total collection of files, their mutual relations, records, and fields (schema). The DB80 compiler outputs a db description file, which in turn is used (referred to) by subsequent SODA and DUET translations.
Ref. Database80, RCSL: 21-V031.

2.3.2.3 SODA

SODA is the name of a formal language for local data description (subschema). Based on a common DB description (using DB80) and a local data description (using SODA) for each application program, the system enables the user to view the relevant parts of the database logically as a number of interelated record sets without concerning himself about the physical representation. SODA also includes a DBMS (Data Base Management System).
Ref. SODA, RCSL: 21-V019.

2.3.2 Data base system

2.3.2.4 DB utilities

Among others, the data-base utility programs include:

- REORG80, which is used to initialize and reorganize (change) a database.
- PRINT80, a program to print selected parts of the data base.
- SORT80, a sorting program.
- SPLIT80, a splitting program (the opposite of merging).

2.3.3 Genius

Genius is a report generating system, which is used to generate programs that produce reports and results from all kinds of application programs. Genius is implemented as a declarative language and provides the required facilities in a much more convenient and powerful form than that known from traditional report generator systems, such as RPG 2.
Ref. Genius Manual, RCSL: 21-V034.

2.3.4 Sysdok

Sysdok is a library system for storage and retrieval of program source texts, keeping track of version numbers, last-changed date, etc.
Ref. Sysdok, RCSL: 21-V033.

2.3.5 Duetcom

Duetcom routes the transactions, interfacing on the one hand with the basic software and on the other hand with the transaction processing module. On the incomming side Duetcom handles the transaction queue, normally by means of multiple buffers, and on the outgoing side it routes answers, print outs, etc. to the proper terminal.
Ref. DUETCOM, RCSL: 21-T003.

2.4 Standard system software

By standard software we mean the operating system, programming language, etc. The major part of this description covers items operating within the RC8000 CPU/storage itself, but for the sake of completeness the device controller software (RC8301, equivalent to RC3600/ will be mentioned as well, even though the device controller is normally considered to be a "static" system.

2.4.1 Algol

Algol is the central programming language. It can be used directly, as the well-known high-level programming language it is, or for the implementation of still higher level "system" languages, as is the case with DB80, SODA, DUET, etc.

The present version of Algol is Algol 7, based of course on the original Algol 60 report, but with comprehensive extensions in several directions, of which the latest concern usage in real-time environments.
Ref. Algol 7 Reference Manual, RCSL: 42-i0606, and
Algol 7 Users Manual, RCSL: 42-i0781.

2.4.2 File processor (fp)

The file processor is a control program which together with an operating system controls the execution of the user's programs and the access to his files. Normally an fp command is the call of a program, either a user program or a utility program, where fp provides a formal means of transferring parameters to the called program.
See reference in Sect. 2.4.3.

2.4.3 Utility programs

The system 3 utility programs cover all sorts of catalog handling, data handling, and job control programs.
Ref. SYSTEM 3 Utility Programs, Part 1 and 2, RCSL: 31-D364 and 31-D422.

2.4.4 Boss 2 operating system

Boss 2 is the standard general-purpose operating system for the RC8000. In relation to Teledata, Boss is used for the off-line part of the system only, such as post processing, utility programs, and program maintenance.
Ref. BOSS 2 Users Manual, RCSL: 31-D370,
BOSS 2 Operators Manual, RCSL: 31-D312, and
BOSS 2 Installation and Maintenance, RCSL: 31-D421.

2.4.5 Operating system s

s is the basic operating system of the RC8000, normally used only with self-contained on-line systems such as Teledata. It provides the basic means for utilising system resources, but has no job control facilities.
Ref. Operating system 's', RCSL: 31-D455.

2.4.6 Monitor

The purpose of the monitor is to bridge the gap between the hardware and the abstract concept of multiprogramming. Thus the monitor provides facilities for simulation of parallel processes, communication among processes, creation control, and removal of processes.

2.4.6 Monitor

Ref. RC8000 Monitor, Part 1, Design Philosophy,
RCSL: 31-D476,
RC8000 Monitor, Part 2, Reference Manual,
RCSL: 31-D477, and
RC8000 Monitor, Part 3, External Processes,
RCSL: 31-D478.

2.4.7 Device controller

The RC8000 device controller, RC8301, is a slightly disguised RC3600, so they have a common general software architecture.

Of particular interest to the RC8000 user are the Network Control Program (NCP) and the device drivers, because the core and CPU time requirements of both parts are very much dependent on the devices in question. For communication lines care should be taken to include a possible protocol module as well as the device driver itself.
Ref. RC3600 System Software Architecture,
RCSL: 42-i343.

2.4.8 RCNET

RCNET is an RC3600 software system for a general-purpose packet switching communications network.

The system contains modules for simple concentrators as well as more elaborated packages for complex multinodal networks. By means of RCNET several host computers can be tied together, and the terminal operator can then choose which host computer he wishes to communicate with by means of operator commands.
Ref. RCNET, General Description, RCSL: 31-D372.

3. Hardware

3.1 General

Teledata is relevant to RC8000 System Models 45 and 55. The two models differ mainly in processing power, whereas the general system architecture including peripherals is much the same, founded on the concept of an RC8000 CPU/storage and one or more RC8301/RC3600 device controllers. The disc system is connected directly to the RC8000 bus, while other devices are connected to a device controller, which in turn is connected to the RC8000 system. Device controllers may be located remotely or locally to the RC8000 system; in case of remote placement they are connected through RCNET to the local device controller (at least one local device controller is required).

3.2 RC8000 CPU/storage

RC8000 is a medium sized computer with a 24-bit word length and, dependent on the model, up to 4 M words of primary storage.

The instruction repertoire comprises 64 function codes, each working on 4 registers, with 16 address calculation modifications and a 12-bit displacement. Privileged instructions and memory protection associated with a monitor mode ensures complete monitor control and mutual storage protection among user processes.

For Teledata a minimum configuration of 128 K words is recommended.
Ref. RC8000 Reference Manual, RCSL: 31-D383.

3.3 Disc system

The disc system consists of a disc controller, adaptor(s), and drive(s).

3.3.1 Disc controller

The disc adaptor interfaces the drive(s) to the controller and the RC8000 CPU through the execution of channel programs set up in memory. One disc adaptor will serve up to 4 drives, and 4 adaptors can be connected to the bus.

3.3.2 Disc drive

At present the RC8000 range of disc drives includes units with fixed or removable discpacks.

Units with removable packs are of the single-spindle, moving-head type, available in sizes of 33, 66, 124 or 248 M bytes per drive.

The fixed media drives are available in sizes of 10 and 20 M bytes per drive. They have a 1 Mb head-per-track option, i.e. for this 1 Mb the average access time is approx. 10 ms, instead of the usual 30-40 ms for the moving-head disc.

When planning a configuration for an on-line system such as Teledata, it should be taken into consideration that the more drives (including one with the head-per-track option) the better, because it minimizes head movements. Usually a minimum of three drives is recommended.

3.4 Magnetic tape

The range of magnetic tape drives comprises 9-track units with tape speeds of 25 and 75 ips and densities of 800 or 1600 bpi. For special purposes, 7-track units with appropriate densities are available as well.

3.5 Printers, high speed

High-speed printers are connected with a parallel interface to a CPU system, i.e. they must be placed local to the RC8000 itself or as part of a remote RC3600 device controller (concentrator). Printing speeds of 250-2000 ipm can be accomodated by the wide range of printers offered. Furthermore for each printer there is a choice of character set (usually by means of interchangeable print drum or chain.

3.6 Communications

Asynchronous, binary synchronous (BSC), and HDLC (ISO standard corresponding to IBM SDLC or CCITT X 25) communication procedures can be of relevance to Teledata installations. They are handled separate communication controllers (multiplexors) within the device controller (concentrator).

Normally communication to terminals (including the RC800/20 concentrator) is asynchronous, and to concentrators synchronous (RC3600, RC800/21-22, and Datapoint). It should be noted that terminals work in full-duplex (echo-duplex) mode, i.e. on a dial-up line the maximum transmission speed is 300 bps, and 1200 bps on a full duplex leased line.

Transmission speed on high-speed HDLC trunk lines is usually 9600 bps, dependent on line qualities.

3.7 Terminal printers

Printers equipped with a serial communication interface can be connected to the system in the same way as the interactive terminals.

Within the Teledata system printers are logically related to terminals; however, the physical connection can be either by separate line or in parallel to a terminal (VDU) dependent on the requirements.

3.8 Terminals

Terminals can be teletypes or VDU's. Communication is asynchronous full-duplex (echo-duplex); please see Sect. 3.6 above. They are all tty compatible and V24 interfaced. For in-house use local modems (current loop interfaces) are available.

3.9 Concentrators

Several types of concentrators are available, the choise depending on the number of terminals in question.

a) RC3600 for up to 32 (or even 64) terminals and medium-speed printers. Uses the HDLC or RCLC (software HDLC) full-duplex communications procedure on the high-speed trunk lines under control of the RCNET software system.

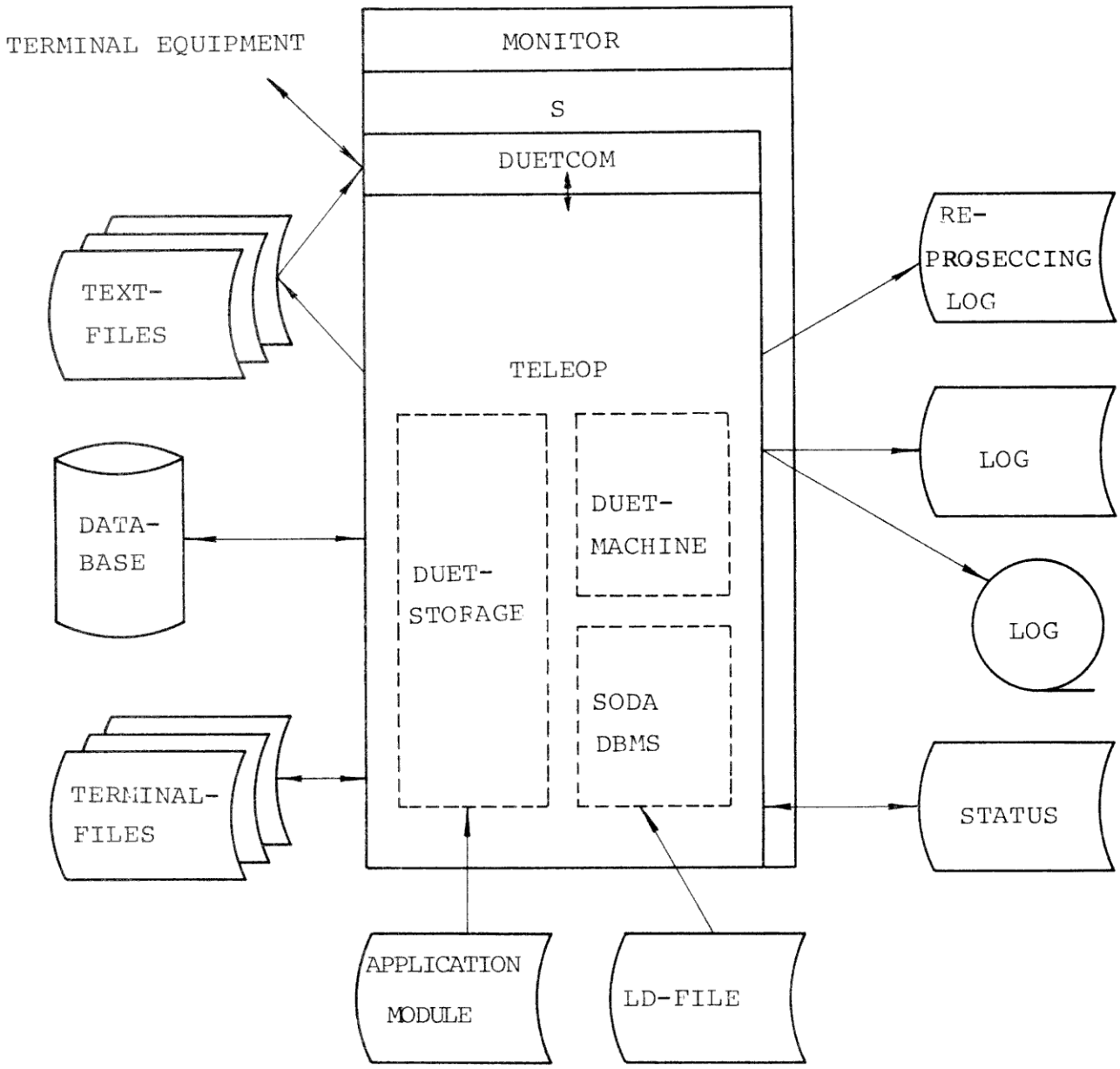
b) RC800 Models 21-22 for 8 and 16 terminals respectively. Uses RCLC and RCNET as a) above.

c) RC800 Models 1-6 for up to 8 terminals and a printer. Uses the RCLC half-duplex communications procedure, thereby requiring considerable core and CPU resources in the device controller.

3.9 Concentrators

d) RC842 is a TDM multiplexor, suitable for up to three additional VDU's and a terminal printer. Communication to the central site or RC3600/800 concentrators is asynchronous and a full-duplex 1200 bps leased line is required.

ELEMENTS IN A RUNNING TD-SYSTEM



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RCSL: 21-T011

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