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ENGINEERING PRODUCT SPECIFICATION, PART 1
DATANET 305 SUBSYSTEM

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1.0 GENERAL DESCRIPTION

The DATANET 305 Subsystem hardware consists of a communication processor implemented by modules of the DATANET 30 for specific and limited offering with 6000 Systems. Three configurations of the DATANET 305 shall exist and all shall be variations of the following existing modules.

- Basic Processor and Interface Unit

Data Communication Processor DCP-932 (16K Word Memory)
Computer Interface Unit CIU-931 (Modified)

- Communication Modules

Bit Buffer Unit (Asynchronous)	BBU-934
Bit Buffer Channels (Asynchronous)	BBC-932 or BBC-933
Bit Buffer Channels (Asynchronous)	BBC-934
Character Word Units (Synchronous)	CWU-931
Character Buffer Channels (Synchronous)	CBC-931

1.1 OBJECTIVES OF THE DATANET 305

The principal objectives of offering a limited communication facility to the 6000 Systems with a modified DATANET 30 are summarized below:

- Offers a limited number of communication features to a low end 6000 System at a minimum cost.
- Cost is minimized due to limited number and types of remote terminals supported.
- Costs of hardware, and development are minimized by utilizing existing hardware and software.
- Immediate availability of hardware and software allows simultaneous offering and shipment of limited communications via the IOM.
- DATANET 305 is limited in capability and provides a natural means for upgrade to the DATANET 355.
- GECOS III is to be modified to provide coexistent operation with a DATANET 305 and DATANET 355.
- The DATANET 305 and GECOS Software will be upgraded to provide the user an identical interface as the GERTS 355 for those terminals supported.

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1.2 PURPOSE OF THIS DOCUMENT

The purpose of this document is to define the requirements (hardware and software), phases of implementation, capabilities and restrictions of the DATANET 305 subsystem. The descriptions are purposely brief in detail since nearly all features included are described in already existing documentation.

Only changes in DATANET 30 hardware and GERTS 30 software that are pertinent to the implementation of the DATANET 305 are included in this specification.

1.3 APPLICABLE DOCUMENTS

PDS - DATANET 30 Data Communication Processor 43A130933
 PDS - DATANET 30 Memory 43A134490
 DATANET 30 Buffer Selector Specification 43A143078
 PDS - Computer Interface Unit (CIU) 931 43A140499
 EPS - Bit Buffer Unit (BBU) 934 43A174540
 EPS - Bit Buffer Unit (BBU) 932 M50EB99940
 PDS - Character Word Unit (CWU) 931 43A160061
 PPS - Common Peripheral Interface (CPI) 43A130524
 Refurbish Instructions for DATANET 30
 SPS - General Remote Terminal System (GERTS) M50EB00618
 SPS - General Electric Comprehensive Operating Supervisor
 (GECOS III) M50EB00046
 EPS-1 GERTS/355 43A219619
 EPS-1 General Design Requirements for GE-655 and GE-355 Systems 43A177851
 EPS-1 GE-655 I/O Multiplexor Central 43A219604
 EPS-1 IOM Common Peripheral Channel 43A219605
 EPS-1 Computer-to-Computer Communication Disciplines 43A177704
 On-Line Peripheral Test System (OPTS-600) 43A155998
 Data Set Information Specification 43A232446

Bell System Data Communication Technical References

<u>Data Set</u>	<u>Date</u>
103A	2/67
103E	10/68
103F	5/64
201A/B	8/69

2.0 SUBSYSTEM FUNCTIONAL CAPABILITIES

2.1 PRICE PERFORMANCE

The principal objective of the DATANET 305 is to offer communication capabilities for small systems more efficiently and at a lower price than the DATANET 355. Implementation of the DATANET 305 should provide a price advantage per line transition to a DATANET 355 at no more than two DATANET 305's.

2.2 LINE CONFIGURATIONS AND TERMINALS

Three fixed versions of the DATANET 305 are to be offered.

2.2.1 DCP 301

Twelve Low Speed Asynchronous Lines

Up to three different data rates in one DCP.

2.2.2 DCP 302

Two Voice Grade Synchronous half duplex lines

Data rates 2000, 2400 or 4800 bps.

2.2.3 DCP 303

Twelve Low Speed Lines, maximum of 8 at 300 bps.

Two Voice Grade half duplex lines.

2.2.4 Low Speed Terminals

Low speed terminals supported by standard software are as follows.

- Available at the end of phase 1 are:

Model 33 and 35 Teletypes @ 110 bps

Model 37 Teletype @ 150 bps

GE TerminiNet 300 @ 300 bps

- Additional terminal at the end of phase 3

IBM 2741 terminal @ 134.5 bps

In all cases a maximum of three low speed data rates will be available in a single DATANET 305.

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2.2.5 Voice Grade Terminals

Voice grade terminals supported by standard software are:

Phase 1 - G100 Series @ 2000, 2400 bps

Utilizes limited GERTS 30 Software.

Phase 2 - G100 Series @ 2000, 2400 or 4800 bps

With Computer-to-Computer Communication Disciplines.

XX Other applicable batch terminals capable of operating with Computer-to-Computer Communication Disciplines and compatible interface.

Phase 3 - VIP 775 @ 2000/2400 bps

2.2.6 Concurrent Terminal Summary

The table below indicates the variations possible in the maximum number of lines for the DCP 301, 302 and 303, in the final offering (completion of phase 3).

BPS	110	110	134.5	150	300	2000/ 2400	4800	2000/ 2400
Terminal	TTY 33	TTY 35	IBM 2741	TTY 37	TN 300	G-100 Series		VIP-775
DCP 301	Any combination up to 3 rates and a total of 12 terminals							
DCP 302						1	2	1
DCP 303	Any combination up to 3 rates and 12 terminals of which no more than 8 are 300 bps.					1	2	1

2.3 RELIABILITY AND MAINTAINABILITY

The Reliability and Maintainability of hardware and software of the DATANET 305 shall be consistent with that presently obtained on installed DATANET 30's with similar line configurations.

2.4 MINIMUM CHANGE TO SYSTEM HARDWARE

The DATANET 305 shall interface to the 6000 systems via the Input-Output Multiplexor, IOM. The interface shall be unique to the DATANET 305 on the IOM and shall be an exception to the Common Peripheral Channel EPS-1, 43A219605 in the IOM.

No hardware changes are required on data sets or terminals interfacing on the line side of the DATANET 305. Interfaces shall be identical to those presently on the DATANET 30. All interfaces to data sets shall be via EIA RS-232 B/C interface. Data sets with EIA interfaces shall be required.

2.5 MINIMUM CHANGE TO SYSTEM SOFTWARE

System software changes (other than in the DATANET 305) shall be limited to the GECOS Operating System. These system changes are limited to:

Phase 1

- Modifications required to interface the DATANET 305 or the DATANET 30 but not simultaneously via the IOM-0.
- Remove any visual identification to the DATANET 30 in
Startup
Operator Messages

Phase 2

Phase 2 consists only of software changes in the DATANET 305 so that it matches the external and internal interface of the DATANET 355.

Phase 3

Modify GECOS Operating System to provide capability of coexistence of the DATANET 305 on the IOM, and the DATANET 355 on the Systems Controller.

3.0

HARDWARE IMPLEMENTATION

The DATANET 305 is composed of the following elements:

	DCP		
	<u>301</u>	<u>302</u>	<u>303</u>
DCP 932 (43A130933)	1	1	1
CIU 931 Modified (43A140499)	1	1	1
BBU-934 (43A174549)*	2 or 3	0	2 or 3
BBC-932 (M50EB99940)	12	0	12
or BBC-934 (Same as BBU-934)	12	0	12
CWU-931 (43A160061)	0	1	1
CBC-931 (Same as CWU-931)	0	2	2

*Number of BBU's (2 or 3) depends on number of data rates required.

3.1

HARDWARE ORGANIZATION

Figure 1 is a diagram of the DATANET 305 configured in a Series 6000 System coexistent with a DATANET 355. For completeness a DATANET 30 is also shown in dashed lines attached to the IOM but implemented with a new software module; i.e., GERTS/XXX. The DATANET 30 implemented with GERTS 30 software cannot operate coexistent with either a DATANET 305 or 355.

This diagram is not intended to represent either maximum or minimum configurations but to illustrate the interconnection points for the various DATANETS available with the 6000 Systems.

Table 1 illustrates the limits and variations of DATANET coexistence on 6000 Systems. The limits shown are determined by connectability and may or may not be offered as a product.

Table 1 is a summary of the configurations identified by Marketing as being required for Series 6000 Systems. In general the sum of the DATANETS must not exceed three per 6000 System. The maximum is four if all are DATANET 355's. Customer owned DATANET 30's, if implemented with new software and hardware modifications, may be attached simultaneously to the IOM and these have been included in the table.

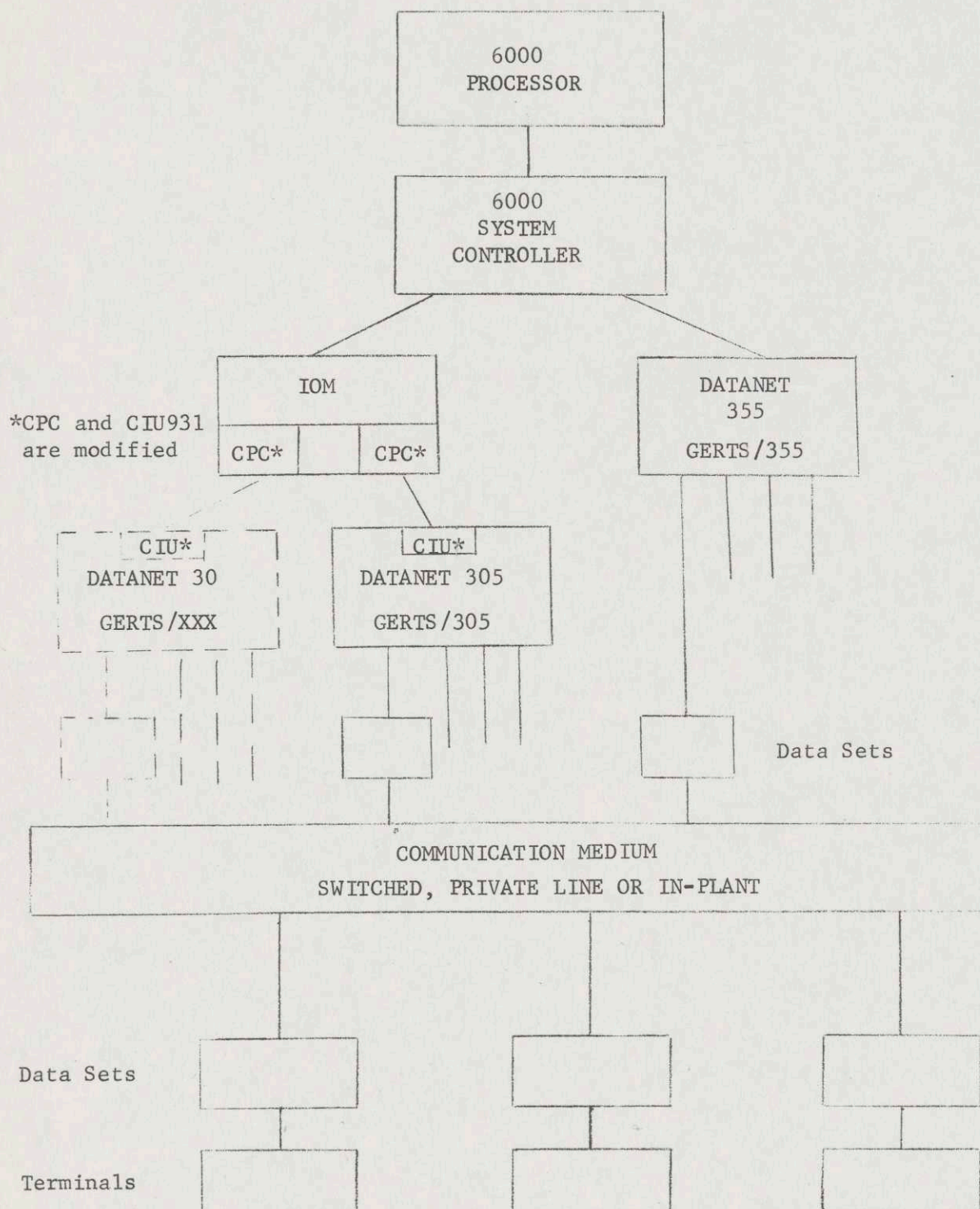


Figure 1. Series 6000 Systems Communication Subsystem Interconnection Diagram

DATANET 305 GERTS/305	DATANET 355 GERTS/355	DATANET 30 GERTS/XXX
1-3	0	0
0	1-2	0
0	0	1-3*
0	1-2	1
1-2	0	1
0	1	1-2
1	0	1-2
1	1	1
1	1-2	0
1-2	1	0

*Where DATANET 30's are installed alone on 6000 Systems, the software may be either GERTS/30 or GERTS/XXX.

Table 1. Series 6000 DATANET Configurations

3.2 HARDWARE INTERFACES

3.2.1 6000 System Interfaces

The DATANET 305 interfaces the 6000 System via a modified CPI channel. In the IOM the Common Peripheral Channels shall contain an exception that allows either a DATANET 30 (CIU-931 modified) or a DATANET 305 (CIU-931 modified) to interface.

A DATANET 305 with a CIU-931 modified shall not be functionally compatible to a Common Peripheral Interface (43A130524).

Electrical characteristics of the present CIU-931 may not be capable of interfacing with the IOM. If modifications are required to provide electrical compatibility the modification kit shall be separate and additional to the functional modification specified above. The electrical compatibility kit, if required, may be offered to owners of existing DATANET 30's. The DATANET 305 functional modification kit shall be restricted to DATANET 305's.

3.2.2 Data Set Interfaces

Data sets permissible on a DATANET 305 are those presently used on the DATANET 30 with the exception of the 201B Data Set with contact closures and selected 4800 bps data sets.

Data sets and options with respect to Buffer Channels and terminals are listed in Table 2.

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	Rate (BPS)	Switched	Private
<u>Bit Buffer Unit 934</u>			
Bit Buffer Channel 932/933 Model 33 TTY	110	103A/E	103F
Bit Buffer Channel 932/933 Model 35 TTY	110	103A/E	103F
Bit Buffer Channel 934 IBM 2741	134.5	103A/E	103F
Bit Buffer Channel 934 Model 37 TTY	150	103A/E	103F
Bit Buffer Channel 934 TermiNet 300	300	103A/E	103F
<u>Character Word Unit 931</u>			
Character Buffer Channel 931 G-100	2000	201A	
Character Buffer Channel 931 G-100	2400		201B
Character Buffer Channel 931 G-100	4800		MILGO 4400/48
	4800		RIXON SEBIT 48C
Character Buffer Channel 931 VIP 775	2000 2400	201A	201B

Selection of options for the above data sets are specified in DATA SET INFORMATION SPECIFICATION, 43A232446.

Table 2. Buffers-Data Set-Terminals

3.3 HARDWARE MODULES

The hardware modules utilized in the DATANET 305 shall consist of existing and modified DATANET 30 hardware whose source may be as follows:

1. New finished goods
2. Returned and refurbished goods
3. Returned, refurbished and modified goods

Item 3 includes

- DCP 910's converted to DCP 932's by removal of option kit #43A220735
- BBU-932's converted to BBU-934's
- BBC-932's converted to BBC-934's
- etc.

New hardware that may be required to electrically interface the DATANET 30 to the IOM shall be separated into two types.

1. Modification kit to convert the DATANET 30 to the DATANET 305 with a unique interface to the IOM (CPC).
2. Modification kit to provide compatibility of the DATANET 30 to the IOM (CPC).

All voice grade channels are synchronous and shall use CWU-931's. Only Group 2's (CWU-931) shall be used on the DATANET 305. All Character Buffer Channels shall be CBC-931's, Group 2 (EIA interface). The CIU-931 when used on the DATANET 305 shall be modified to have an interface unique to the Common Peripheral Channel on the IOM.

3.3.1 Buffer Selection

Asynchronous low speed lines are limited to three rates for each DATANET 305. Each individual data rate requires a Bit Buffer Unit with a suitable timing plug. The number of individual rates (3 maximum per DATANET) and the rates selected must be identified at order time such that buffer units and timing plugs may be provided in the unit.

Terminal types must be stated also such that data rates, code levels, number of stop bits, etc., are known for proper buffer channel selection.

3.4 DATANET 305 PACKAGING

The DATANET 30 packaging shall be modified to match in appearance with the 6000 Series Industrial Design styling employing ribbed skins. These modifications will include:

- Reskin the DATANET 30 with 6000 Series ribbed type skins and matching colors.
- Replace three doors on each side with six doors on each side to achieve structure strength for new skins.
- Recess the operators/maintenance panel such that it is mounted out of view behind a closed door.
- Provide spaces or extenders to the present frame such that the new doors/skins allow sufficient clearance for presently mounted components, i.e., tape reader and power supplies. Alteration of the cabinet size or skins shall not substantially effect the cooling air flow as presently contained in the DATANET 30.
- Extend selected parallel indicator lights and/or switches from the recessed operator/maintenance panel to an external area for operator monitoring. Indicators and/or switches to be included are:

1. Halt	Indicator Only		
2. Run	"	"	
3. Error	"	"	
4. AC On	Indicator and Switch		
5. AC Off	"	"	"
6. DC On	"	"	"
7. DC Off	"	"	"

Indicator light fixtures and colors are to be consistent with those of the 6000 Series DATANET 355, and where possible as specified in EPS-1, GENERAL DESIGN REQUIREMENTS FOR GE-655 and GE-355 SYSTEMS, 43A177851.

The DATANET 305 shall conform to and have U.L. Standard 478 approval.

3.5 GENERAL DESIGN REQUIREMENTS

The DATANET 305 is to be offered as a new member of the 6000 Series. Since the implementation of the DATANET 305 consists of a modified DATANET 30 its design is not compliant with the general requirements of EPS-1, General Design Requirements for 655 and 355 Systems. When installations are planned, special considerations must be given to these deviations.

Three notable exceptions that may or may not affect shipping, installation and operating conditions (with respect to other 6000 components) are summarized below.

	<u>EPS-1 43A177851</u>	<u>DATANET 305</u>
Maximum Equipment Size	Length 66" Width 27½" Height 66"	117" 32" + 4" approximately 76"
Weight (Maximum) (Uncrated)	Domestic 2000 lbs Other 1323 lbs	2200 lbs (before new skins)
Operating Temperature	[50 to 100.4 deg.F]*	65 to 85 deg. F
Relative Humidity	[10 to 85%]	40 to 80%

*The temperature and humidity limits are interrelated and these figures represent the permissible extremes.

4.0 SOFTWARE IMPLEMENTATION

Software for the DATANET 305 subsystem is of three major types. These are:

GERTS/305 in the DATANET 305

Programmable Remote Terminals

GERTS/6000 in 6000 Central Processor

4.1 Each new or modified software module of a DATANET 305 will be implemented in a definite time phase. Three phases of implementation are defined. Each phase provides an additional capability for the DATANET 305 subsystem. Implementation of various phases may be accomplished simultaneously or separately depending upon available resources.

4.1.1 Phase 1

Principal Software

Function

GERTS/30 → (GERTS/305)

- Add GE TermiNet 300
- Modify I/O Software for IOM-0
- Remove visible references to DATANET 30
- Modify T&D Software
- Remove Keyboard Terminal Batch Interface

GERTS/G-100

- Restricted to GERTS/115 Communications as available with DATANET 30

GERTS/6000

- Remove visible references to DATANET 30

4.1.2 Phase 2

Principal Software

Function

GERTS/305

- Implement Computer-to-Computer Line Disciplines and add 4800 bps capability
The GERTS/G-100 Remote Terminals may now communicate to the DATANET 305 with the same interface as with the DATANET 355.
- Implement DATANET 355 remote batch interface to GERTS/6000.

4.1.3 Phase 3Principal SoftwareFunction

GERTS/305

- Add IBM 2741 Remote Terminal @ 134.5 bps.
- Add VIP 775 Terminal @ 2000/2400 bps.

GERTS/6000

- Remove IOM-0 restriction
- Add coexistence of DATANET 305 on IOM and the DATANET 355 on the Systems Controller

Implementation, Produce Assurance and delivery commitments shall be based upon schedules established as per the three software implementation phases.

4.2 TERMINAL CAPABILITIES PER PHASE IMPLEMENTATION

At the end of each phase, the following new terminal capability shall exist.

Phase 1

Model 33, 35 Teletypes	@ 10 cps
Model 37 Teletypes	@ 15 cps
GE TermiNet 300	@ 10 , 15, 30 cps
G-100 Series Remote Batch	@ 2000, 2400 bps

Two-Way-Alternate with GERTS/115
Line Disciplines

Phase 2

G-100 Series Remote Batch	Operation with Computer-to-Computer Line Disciplines (43A177704) @ 2000, 2400, 4800 bps
---------------------------	-----------------------------------------------------------------------------------------------

Phase 3

VIP 775	@ 2000, 2400 bps Two-Way-Alternate
IBM 2741 Terminal	@ 134.5 bps

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4.3 TEST AND DIAGNOSTICS

Test and diagnostics for the DATANET 305 will be of two types; "On-Line" and "Off-Line".

4.3.1 On-Line (POLTS-305)

The on line test system for the DATANET 305 (POLTS-305) will provide testing capabilities for the modified CIU-931, DATANET 305 and remote teleprinters connected to the DATANET 305.

POLTS-305 will operate in the GECOS environment (GECOS on line) with remote operations suspended on the DATANET 305 selected for test. The test system will consist of a CIU-931 Test Page and an Executive Test Page operating under control of the POLTS-6000 Executive in the GECOS System. The Executive Test Page will be written to operate through the IOM on the 6000 System to the modified CIU-931/DATANET 305. The DATANET 305 will be loaded with a T&D operating system similar to the GERTS but designed for the needed test capabilities. This T&D Program will control the operations for testing of the CIU-931, (Counterpart of the CIU-931 Test Page under POLTS-6000) and remote teleprinters on the DATANET 305.

The system configuration running POLTS-305 is:

<u>6000 System</u>	<u>DATANET 305</u>
On Line	Off Line
GECOS	POLTS-305 Program

4.3.2 Off-Line (DATANET 305)

The DATANET 305 Primitive Function Program (TST 115) is to provide a cursory check of the CIU-931 interface to the DATANET 305 in preparation of Level 3 testing. The interface test is controlled by the 6000 System via test number messages which vector the DATANET 305 Program to the specified test. The interface consists of three tests which are identical to the first three tests of the comprehensive test.

The DATANET 305 Comprehensive Program (TST 315) is to test all logical paths in the CIU-931 while communicating with the DATANET 305 from the 6000 System, and to establish the ability of the 6000 System to communicate with the DATANET 305 under procedures specified in the CIU-931 specifications.

The System Configuration running the above program is:

<u>6000 Systems</u>	<u>DATANET 305</u>
Monitor II	CIU-931 Test Tape
TST 1154 - PRG 1154	

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DATANET 305 SUBSYSTEM

Prepared by: L. E. Neely Date 6/10/71
L. E. Neely
Systems Design Engineering

Approved by: C. W. Dix Date 6/11/71
C. W. Dix, Director-Engineering

Approved by: J. D. Hann Date 6/14/71
J. D. Hann, Program Director
Series 200/400/600/8000

Approved by: D. K. Lundberg Date 6/14/71
D. K. Lundberg, Assoc. Director
Product Marketing

REVIEWED BY

G. R. Williams
G. R. Williams, Manager
Systems Design Engineering

Date 6/10/71 T. J. Beatson Date 6/10/71
T. J. Beatson, Manager
System Software Design

L. I. Wilkinson
L. I. Wilkinson, Manager
Systems Engineering

Date 6/10/71 W. R. Chiles Date 6-10-71
W. R. Chiles, Manager
400 Line and Customs

R. L. Guth
R. L. Guth, Manager
I/O Design Engineering

Date 6/10/71 R. L. Guth Date 6/10/71
R. L. Guth, Manager
Computer Design Engineering

P. G. Snee
P. G. Snee, Manager
Product Engineering

Date 6/10/71 C. A. Conover Date 6/11/71
C. A. Conover, Manager
Advanced Systems Engineering

O. J. Nardelli
O. J. Nardelli, Manager
Remote Systems Software

Date 6/10/71 A. L. Longanecker Date 6/10/71
A. L. Longanecker, Manager
600 Central Systems Software

R. F. Straka
R. F. Straka, Manager
Operating Systems Engineering

Date 6/11/71 P. F. Straka Date 6/11/71
P. F. Straka, Manager
Systems Maintainability Engineering

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