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STANDARD ENGINEERING INSTALLATION PACKAGE MULTICHANNEL CIPHERY --ETC(U)  
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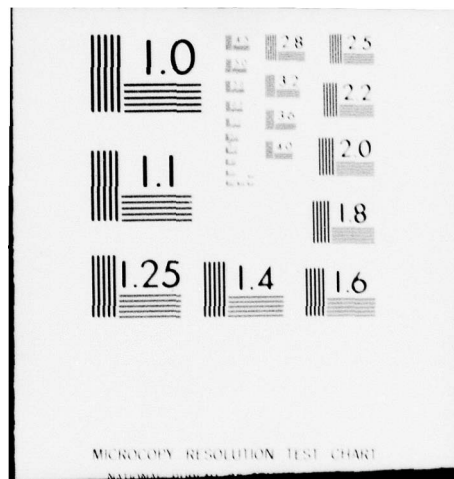
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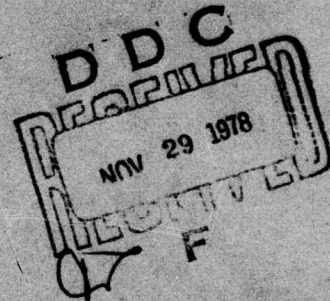
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**STANDARD  
ENGINEERING INSTALLATION PACKAGE**

**MULTICHANNEL  
CIPHER SYSTEM  
TSEC/CY-104 A**



**1 AUG 1978**

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**HEADQUARTERS  
U. S. ARMY COMMUNICATIONS COMMAND  
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#### NEUTRAL LANGUAGE

The word "he" when used in this publication represents both the masculine and feminine genders, unless specifically stated.



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19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Multichannel Ciphony System, TSEC/CY-104A includes TSEC/HY-12A, TSEC/HN-74, and TSEC/KG-34.		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This standard engineering installation package (SEIP) is designed to assist managers, engineers, technicians, logistics personnel, and project officers to plan, engineer, install, and modify the TSEC/CY-104A. It provides system description along with technical functional information of main equipment. It contains a list of applicable documents, provides a checklist for site surveys, applicable drawings, and bills of materials. The SEIP describes quality assurance inspections and gives sample forms to ascertain--continued--		

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20. ABSTRACT--areas of responsibility, checklists, and certification. One section gives a detail test plan and checkout procedure while the system is in operation and suggests the form for a technical acceptance record. The SEIP also contains a completion certificate that verifies the project has met all test criteria.

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DEPARTMENT OF THE ARMY  
HEADQUARTERS, U.S. ARMY COMMUNICATIONS COMMAND  
Fort Huachuca, Arizona 85613

USACC SEIP  
No. 031

1 August 1978

Standard Engineering Installation Package  
MULTICHANNEL CIPHONY SYSTEM, TSEC/CY-104A

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## SECTION 1. GENERAL

1.1 PURPOSE AND SCOPE. The purpose of this standard engineering installation package (SEIP) is to provide subordinate command activities, preengineered guidance for detailed planning, engineering, installing, and testing of communications-electronics (C-E) facilities in accordance with US Army Communications Command (USACC) Supplement 1 to Army Regulation 105-6, C-E Standardized Telecommunications Program. Headquarters, US Army Communications-Electronics Engineering Installation Agency (HQ, USACEEIA) is responsible for the preparation of this document. This document provides USACC standard engineering installation guidance for interface of the TSEC/CY-104A with digital radio systems; for example, microwave radio type AN/FRC-162 (V).

### 1.2 PROJECT CONTROL AND COORDINATION.

1.2.1 Project drawings will be prepared and updated in accordance with the applicable configuration management plan. (See USACSA/USACEEIA Pamphlet 70-1, USACSA/USACEEIA Configuration Management Program.)

1.2.2 Each project/site engineer will be responsible for compliance with the configuration management plan.

### 1.3 SYSTEM DESCRIPTION.

1.3.1 The TSEC/CY-104A is an equipment assemblage consisting of an HY-12A channel bank, an HN-74 interface unit, and a KG-34 key generator. This system is designed for mounting in a standard 19-inch equipment rack and is inclosed in shielded cabinets interconnected with conduit.

### 1.4 FUNCTIONAL DESCRIPTION.

1.4.1 The TSEC/CY-104A provides for the multiplexing of up to 24 voice frequency (VF) 4-wire trunks and associated signaling into an encrypted 1.544 megabits per second (Mb/s) binary bit stream. This function is performed by the three separate components mentioned above. The 24 VF trunks are wired to the HY-12A pulse code modulation (PCM) multiplexer (a VICOM D2 channel bank housed in a shielded cabinet) which samples each voice channel sequentially at the rate of 8,000

samples per second per channel. The result of this sampling is a time division multiplexing (TDM) data stream composed of 192,000 pulse amplitude modulated (PAM) pulses per second. Each pulse is compared against reference voltages and encoded into an 8-bit code word representing a fixed amplitude, one of 128 possible amplitudes above or below zero which corresponds closely to the amplitude of the PAM sample. The 8-bit words representing samples from all 24 channels are sequentially combined to form a 192 bit frame. A framing bit is added, producing a total of 193 bits per frame, 8,000 frames per second, or 1.544 Mb/s. The 1.544 Mb/s digital stream is in nonreturn to zero (NRZ) format, which is fed to the KG-34.

1.4.2 Channel signaling information is encoded by preempting the least significant bit of the code word for each channel during every sixth frame. Each VF channel has an E and M signaling capability built into the channel bank.

1.4.3 The PAM to PCM encoder/decoder is nonlinear, offering smaller quantizing steps for low level signals and larger steps for higher amplitude signals. This technique minimizes quantizing distortion.

1.4.4 The KG-34 encrypts the digital stream and passes it to the HN-74 which contains the clock for system timing and provides either a balanced bipolar output or an NRZ output. The HN-74 provides transmit and receive clocks to the HY-12A and KG-34, alarm interfaces, power for the HY-12A, and controls reframing and resynchronizing functions.

1.4.5 The receive path is essentially the reverse of the transmit. The HN-74 receives the encrypted bit stream and prepares it for the KG-34 which decrypts the stream and returns it to the HY-12A. The HY-12A demultiplexes, decodes, and reconstructs the individual 24 VF channels.

1.4.6 System status is indicated by the service alarm which is activated by local alarm, loop alarm, or remote alarm. Local alarm is initiated by a fuse alarm or loss of frame synchronization for more than 800 milliseconds. Loop alarm is initiated whenever the terminal is looped back for test/maintenance. The alarm condition is transmitted to the far-end terminal by forcing the second bit of each word to logic zero, for a minimum of 20 seconds. A remote alarm is indicated when the condition has been received for 1.5 seconds.

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1.4.7 The HY-12A channel bank has the capability of replacing five of the 24 VF channels with up to five full duplex digital data circuits. The data rates available are 0-20 kilobits per second (kb/s) and 50 kb/s asynchronous, or 16/32/48/56/64/128 kb/s synchronous.

1.5 LIST OF APPLICABLE DOCUMENTS.

1.5.1 Government documents.

STANDARDS:

MIL-STD-188C	Military Communications System Technical Standards
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OTHER PUBLICATIONS:

Manuals

TM 11-490-4, Vols. 1 and 2	Digital Systems Operations Manual (DSOM) (Preliminary Issue)
CCTM 105-50-21	Telecommunications Engineering- Installation Practices, Instal- lation General

Regulations

(C) AR 530-4	Control of Compromising Emanations (U)
CCR 702-1-2	USACC Quality Assurance Program for Engineering, Installation and Acceptance of Communications- Electronics Equipment and Systems
CCCR 702-2	Preparation of Documentation for Test and Evaluation of Communica- tions-Electronics Materiel
(C) MIL-HDBK-232	RED/BLACK Engineering and Installation Guidelines (U)

Directives

DCAC 370-160-3	Site Survey Data Book for Commu- nications Facilities
AFTO 31-10 Series	Standard Installation Practices

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Pamphlets

USACSA/USACEEIA Pam- phlet 70-1	USACSA/USACEEIA Configuration Management Program
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1.5.2 Non-Government documents.

NATIONAL FIRE PROTECTION AGENCY

NFPA 70-1978	National Electrical Code 1978
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1.6 COMMENTS ON PUBLICATION.

1.6.1 Users of this publication are invited to submit recommendations for improvement. Comments should be keyed to the drawing, page, paragraph, and line of the text where change is recommended. A mailing card for convenience is bound with this SEIP. Comments should be sent directly to the Commander, Headquarters, US Army Communications-Electronics Engineering Installation Agency, ATTN: CCC-CED-SEP, Fort Huachuca, Arizona 85613.

1.6.2 Requests for USACEEIA regulations and forms should be addressed to the Commander, Headquarters, USACEEIA, Fort Huachuca, Arizona 85613.



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## SECTION 2. SITE SURVEY DATA AND CHECKLIST

2.1 GENERAL. This section provides information to accomplish the preliminary engineering, equipment layout, and site surveys associated with the TSEC/CY-104A installation.

2.2 SITE SURVEY CRITERIA. The site survey should be conducted in accordance with the guidelines and criteria set forth in Defense Communications Agency (DCA) Circular 370-160-3, and Site Survey Data Book for Communications Facilities. The TSEC/CY-104A is cleared for installation in a Black area in accordance with Black criteria.

2.2.1 Site survey checklist. The sample site survey checklist (fig. 2-1) should be used as a guide by the survey team for identifying and assembling the required technical data during the site survey.

2.2.2 Use of site survey checklist. The checklist, when completed, will aid in preparing an official site survey report with equipment layout drawings. The site survey report will be an inclosure to the project coordination letter which must be forwarded through the responsible agencies for concurrence or nonconcurrence, and any comments. The following items, as applicable, are to be included with the site survey checklist:

a. Single-line drawings of existing electrical distribution system and power supply. If possible, show required changes or additions to meet the new requirements.

b. Copy of DA Form 2701, Job Order Request (repairs and utilities) or Military Construction, Army (MCA) project previously submitted, if any.

c. Floor plan sketch to scale.

d. Comments on any anticipated difficulties in the flow of materials, work, or personnel in the operations area.

e. Local telephone directory.

f. Memorandum of Understanding between using unit, District Engineer, and District Space Coordinator.

g. US Army Security Agency comments.

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2.3 EQUIPMENT CHARACTERISTICS. The physical and electrical characteristics of the applicable equipment are listed in table 2-1. This table should be used as a guide for planning a facility of this type.

Table 2-1. Equipment Characteristics

Equipment	Size	Environmental Requirements	Power	Weight (lb)
TSEC/CY-104A complete	80.375" H 26" D 21.06" W	opr temp: +30 to 120° F storage: 0 to 140° F rel hum: 0 to 90%		200
TSEC/HY-12A	18.25" H 20.25" D 17.50" W		(supplied by TSEC/HN-74) reg: +12, -12, +4 V dc unreg: -48 V dc, 82 W	67
TSEC/HN-74	7" H 16.25" D 17.43" W		115 V ac +10% 50/60 Hz, 48 W	36
TSEC/KG-34	7" H 22.0" D 17.5" W		115 V ac +15% 50/60 Hz, 48 W	45

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SITE SURVEY CHECKLIST  
FOR

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

DATE: \_\_\_\_\_

PROJECT NUMBER: \_\_\_\_\_

SITE LOCATION: \_\_\_\_\_

CITY: \_\_\_\_\_ COUNTRY: \_\_\_\_\_

INSTALLATION: \_\_\_\_\_

BUILDING: \_\_\_\_\_ ROOM: \_\_\_\_\_

PROJECT ENGINEER: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

CLASSIFICATION: \_\_\_\_\_

Figure 2-1. Sample Site Survey Checklist (sheet 1 of 9).



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PROJECT OR TASK NO: \_\_\_\_\_

1. PURPOSE OF SITE SURVEY: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. PERSONNEL CONTACTED OR PRESENT DURING SURVEY:

<u>Name, Grade, and Title</u>	<u>Organization</u>	<u>Phone No.</u>
a. _____	_____	_____
b. _____	_____	_____
c. _____	_____	_____
d. _____	_____	_____
e. _____	_____	_____
f. _____	_____	_____
g. _____	_____	_____
h. _____	_____	_____

3. EQUIPMENT TO BE INSTALLED:

- a. Contractor furnished and installed.
- b. GFE, Government installed.
- c. GFE, contractor installed.
- d. Equipment description chart.

Figure 2-1. Sample Site Survey Checklist (sheet 2 of 9).

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PROJECT OR TASK NO: \_\_\_\_\_

<u>Nomen- clature</u>	<u>Weight</u>	<u>Dimensions</u>	<u>Ambient operating ranges</u>	<u>Heat dissipation</u>	<u>Access clearance requirements</u>
---------------------------	---------------	-------------------	---	-----------------------------	--

4. DOCUMENTATION:

a. Documentation of the status of the physical plant should be completed by requisition and review of the appropriate as-built drawings. The list of as-built drawings obtained is as follows:

<u>Drawing Number</u>	<u>Title</u>	<u>Revision date</u>	<u>Source</u>

b. Drawings not available during the site survey should be requested by local military authorities through channels. Once obtained, the drawings should be forwarded to responsible area electronics engineering installation agency.

c. If as-built drawings of the physical plant are not available, lack sufficient details, or are inadequate, provide a dimensioned sketch of the floor plan including location, dimensions, and identity of each equipment. (Attach sketch.)

Figure 2-1. Sample Site Survey Checklist (sheet 3 of 9).

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PROJECT OR TASK NO: \_\_\_\_\_

d. Additional general information, which bears on the engineering of the facility, is as follows:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. ROOM CONFIGURATION (to be supported by scaled drawings):

a. Floor:

(1) Material: \_\_\_\_\_

(2) Condition: \_\_\_\_\_

(3) Loading capacity: \_\_\_\_\_

(4) Obstructions: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(5) Space available under raised flooring, if installed:

\_\_\_\_\_

Figure 2-1. Sample Site Survey Checklist (sheet 4 of 9).

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PROJECT OR TASK NO: \_\_\_\_\_

## b. Ceiling:

(1) Material: \_\_\_\_\_

(2) Condition: \_\_\_\_\_

(3) Height (suspended or other): \_\_\_\_\_

(4) Obstructions: \_\_\_\_\_

(5) Space available for ducting if a drop ceiling is installed: \_\_\_\_\_

## c. Environmental systems:

(1) Type of heating: \_\_\_\_\_

BTU/hr capacity: \_\_\_\_\_

(2) Type of air conditioning: \_\_\_\_\_

BTU/hr capacity: \_\_\_\_\_

(3) Maximum number of personnel who normally occupy area: \_\_\_\_\_

(4) Humidity controlled: Yes \_\_\_ No \_\_\_

(5) Heat dissipation capacity of existing equipment: \_\_\_\_\_

BTU/hr

(6) Surplus air-conditioning capacity available for this installation: \_\_\_\_\_ BTU/hr

(7) Feasibility of expansion (if necessary): \_\_\_\_\_

(8) Monitoring equipment: \_\_\_\_\_

Figure 2-1. Sample Site Survey Checklist (sheet 5 of 9).



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PROJECT OR TASK NO: \_\_\_\_\_

6. POWER AVAILABILITY:

a. Primary power supplied by commercial means: Yes \_\_\_ No \_\_\_

b. Power specifications:

(1) Present available capacity: \_\_\_\_\_ kW

(2) Voltage: \_\_\_\_\_ volts

(3) Frequency: \_\_\_\_\_ Hz

(4) Phase: \_\_\_\_\_ Ø

(5) Size of feeder lines: \_\_\_\_\_ AWG

(6) Monitoring equipment (if any): \_\_\_\_\_

c. Means of providing emergency power:

(1) Manual start, automatic start, or no-break: \_\_\_\_\_

(2) Manual or automatic switching unit: \_\_\_\_\_

(3) Emergency power available: \_\_\_\_\_

(4) Generator specifications:

<u>Number</u>	<u>Rating (kW)</u>	<u>Frequency (Hz)</u>	<u>Nomenclature</u>	<u>Capacity (kW)</u>
---------------	--------------------	-----------------------	---------------------	----------------------

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

d. Space available for additional generators: Yes \_\_\_ No \_\_\_

Figure 2-1. Sample Site Survey Checklist (sheet 6 of 9).

PROJECT OR TASK NO: \_\_\_\_\_

e. Uninterrupted power requirements: Yes\_\_\_ No\_\_\_

(1) Voltage: \_\_\_\_\_

(2) Current: \_\_\_\_\_

(3) Solid state system: Yes\_\_\_ No\_\_\_

Life after power failure: \_\_\_\_\_

Type of battery: \_\_\_\_\_

f. Presently programed power upgrade (give details): \_\_\_\_\_

g. Technical load:

(1) Present critical technical load: \_\_\_\_\_ kW

(2) Present noncritical technical load: \_\_\_\_\_ kW

(3) Present nontechnical load: \_\_\_\_\_ kW

## 7. EXISTING POWER CONFIGURATION:

Main power panel:

(1) Location: \_\_\_\_\_

(2) Rating: \_\_\_\_\_ kVA

(3) Voltage: \_\_\_\_\_ volts

(4) Phase: \_\_\_\_\_  $\phi$ 

(5) Frequency: \_\_\_\_\_ Hz

(6) Number of spare circuit breakers: \_\_\_\_\_

(7) RED/BLACK TEMPEST: \_\_\_\_\_

Figure 2-1. Sample Site Survey Checklist (sheet 7 of 9).

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PROJECT OR TASK NO: \_\_\_\_\_

8. STATION GROUND:

a. Signal ground installed: Yes\_\_\_No\_\_\_

(1) Type: \_\_\_\_\_

(2) Resistance of true earth ground \_\_\_\_\_ ohms

(3) Date measured: \_\_\_\_\_

(4) Method used: \_\_\_\_\_

(5) RED/BLACK ground distribution boxes available for installation: Yes\_\_\_No\_\_\_

b. Protective ac ground installed: Yes\_\_\_No\_\_\_

(1) All equipment grounded to ac protective ground by separate wires: Yes\_\_\_No\_\_\_

(2) Ferrous shields tied to ac protective ground bus: Yes\_\_\_No\_\_\_

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PROJECT OR TASK NO: \_\_\_\_\_

9. PRESENTLY INSTALLED EQUIPMENT: (List type and quantity of installed equipment that will be associated with or used for this installation.)

<u>Item No.</u>	<u>Room location</u>	<u>Nomenclature</u>	<u>Qty in operation</u>	<u>Qty reserved</u>

10. MISCELLANEOUS:

\_\_\_\_\_  
Site Survey Team Chief

Figure 2-1. Sample Site Survey Checklist (sheet 9 of 9).

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### SECTION 3. INSTALLATION SPECIFICATIONS AND INSTRUCTIONS

3.1 GENERAL. The instructions outlined in this section provide standard engineering guidance for the installation of the TSEC/CY-104A.

3.2 INSTALLATION GENERAL INSTRUCTIONS. The equipment will be installed in accordance with established criteria, the inclosed engineering drawings and instructions, and referenced drawings and publications deemed necessary by the engineering activities responsible for the project. Installer personnel must be familiar with (C) MIL-HDBK-232, AR 530-4, and CCTM 105-50-21, Telecommunications Engineering- Installation Practices, Installation-General, T.O. 31-10 Series, Standard Installation Practices, and NFPA 70-1978, National Electrical Code 1978, to ensure that the facility conforms to and is installed in accordance with standard installation procedures.

3.2.1 Detail instructions. The equipment should be installed in sequential steps to assure compliance with the installation drawings. Minor changes to the sequence of installation procedures may be made in consideration of available manpower, material, equipment, and facilities. All drawings referenced are STD-MX-0007. For ease in indentifying drawings throughout the remainder of the installation instructions, the drawings will be referenced as sheets 1 through 12. The drawings referenced are contained in section 4. Specific installation instructions for routing signal cable through duct or over cable ladders are included. Site survey and site requirements will determine the particular installation methods to use. Sequential installation steps are as follows:

a. Inventory equipment and installation hardware, and inspect for damage.

b. Disconnect all ac power to the equipment.

c. TSEC/CY-104A rack.

(1) Bolt down and assemble the equipment rack and components as shown on sheet 2.

(2) Connect TSEC/CY-104A equipment rack to the station cabinet ground as shown on sheet 4.

(3) For sites using cable ladders, install the mounting brackets for the twinaxial cable plugs and the conduit support



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brackets as shown on sheet 2, views A-A and B-B. Also install the ac power conduit and the signal cable conduit as shown on sheet 3.

d. Interface cabling.

(1) Install the VF multipair cables and the (3-conductor) alarm cable between the TSEC/HY-12A and the facility frame as shown on sheets 5 through 11.

(2) Install the twinaxial cables between the TSEC/HN-74 and the twinaxial cable plug mounting bracket as shown on sheet 2 and sheets 6 through 11. Sites not requiring mounting brackets will install the twinaxial cables in accordance with 3.2.1c(3) above.

e. Interconnecting cables. Install the interconnecting cables/wires as indicated in tables A and B and figures 1, 2, and 3 as shown on sheet 11.

f. Ac power wiring.

(1) Install the ac technical power to TB-2 of the TSEC/KG-34 as shown on sheets 5 through 10 and table A, detail A, and figure 2 as shown on sheet 11.

(2) Install the ac utility power to the utility outlet panel located at the bottom of the rack as shown on sheets 5 through 10.

g. Locking device installation. Install the locking device as shown on sheets 2 and 3.

h. Security curtains. Install the security curtains shown on sheet 12. The security curtains are options and may not be required at all sites.

3.2.2 Cutover information. Sequential steps required to make cutover are deployed jointly by the operations and maintenance command and USACEEIA.

3.2.3 Equipment removal instructions.

a. Instruction for the movement of any unique equipment shall be discussed with the project engineer, installation supervisor, and operation and maintenance (O&M) personnel.

b. All unused cable will be removed from this site.

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3.2.4 System interconnecting kit instructions (fig. 3-1).

a. HY-12A to HN-74.

(1) FL 54 to J101.

(2) FL 55 to J104.

(3) FL 56 to J105.

b. HY-12A to KG-34.

FL 58 to TB1-5 and TB1-6 (shield).

c. HN-74 to KG-34.

(1) J102 to TB1-1 and TB1-2 (shield).

(2) J103 to TB1-3 and TB1-4 (shield).

(3) J106 to TB1-7 and TB1-8 (shield).

d. HY-12A to KG-34.

(1) FL 59 to A12J2.

(2) FL 60 to A14J2.

e. HY-12A to HN-74.

(1) +4 volts lead from FL 63 to TB101-1 (yellow).

(2) -12 volt lead from FL 62 to TB101-2 (red).

(3) +12 volt lead from FL 61 to TB101-3 (gray).

(4) -48 volt lead from FL 53 to TB101-4 (black).

(5) Ground lead from terminal lug to TB101-5 (white).

(6) Alarm lead from FL 57 to TB102-1 (violet).

f. Install wires from PREP and EAP from HN-74 TB102-3 and TB102-5 to the KG-34 TB4-10 and TB4-12, respectively.

g. Use rubber grommet on TW-1 and TW-2 (HN-74) without conduit.

h. In the KG-34, remove the jumper on A12P2 and install a UGC-88 connector.

1 August 1978

SEIP 031

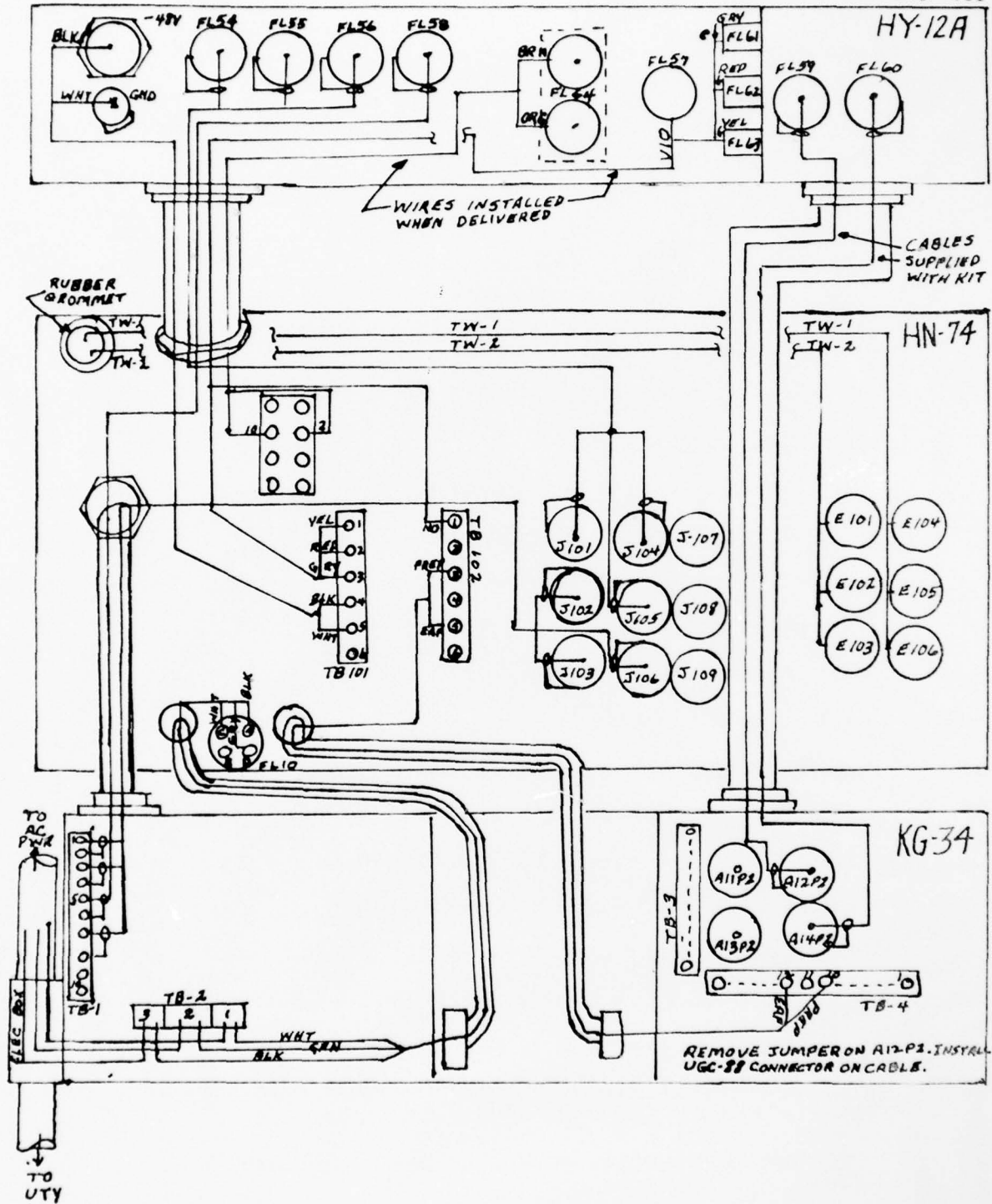


Figure 3-1. System interconnecting kit.

1 August 1978

SEIP 031

#### SECTION 4. ENGINEERING INSTALLATION DRAWINGS

4.1 GENERAL. This SEIP contains only engineering installation drawings necessary for the installation of the TSEC/CY-104A.

4.2 MODIFICATION OF INSTALLATION DRAWINGS. The engineering drawings may be modified during and after installation to reflect adaptation to local physical and environmental conditions. Copies of modified drawings should be retained on site and changes, corrections, and deletions forwarded to the responsible area electronics engineering installation agency.

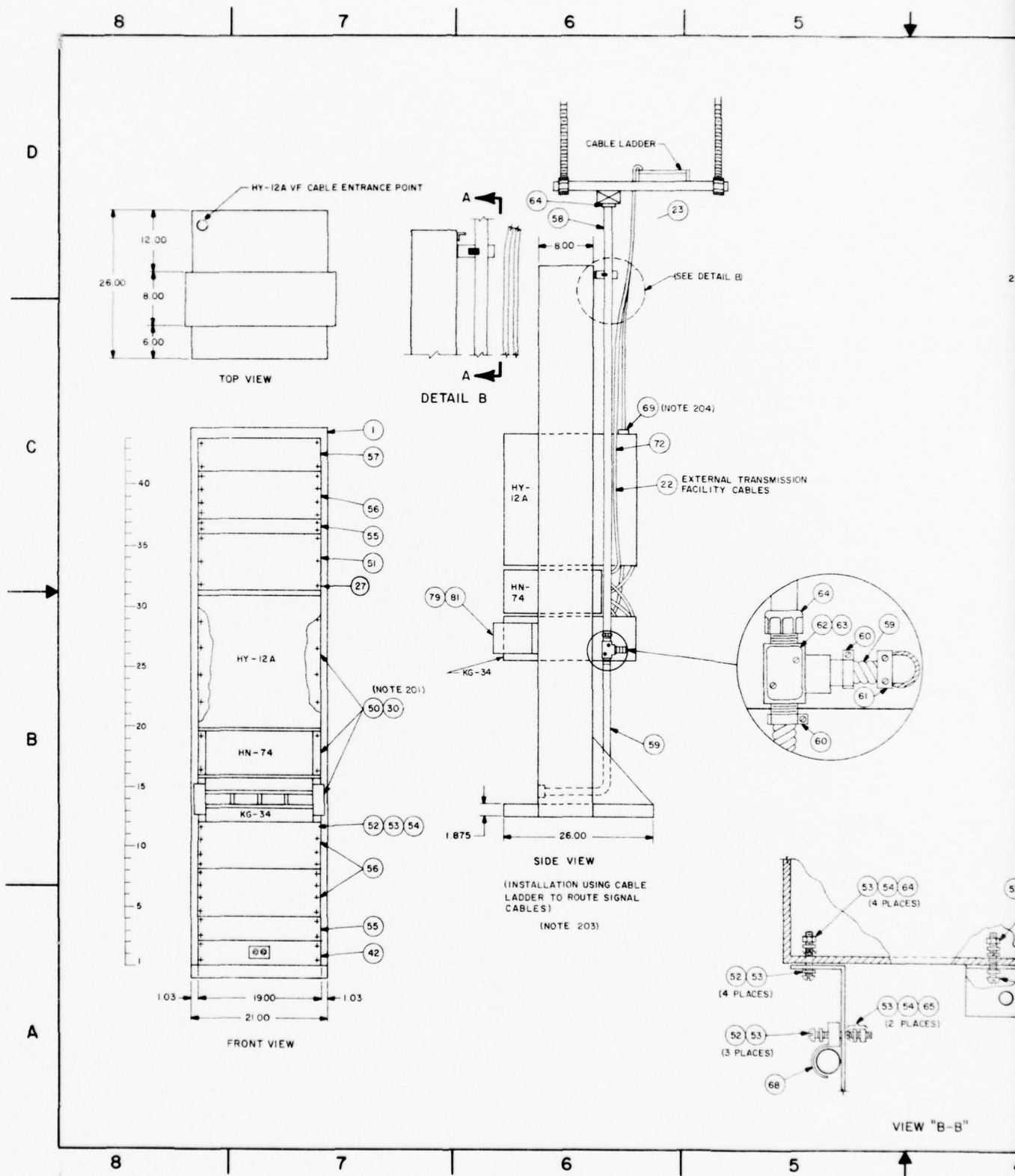
4.3 US ARMY COMMUNICATIONS-ELECTRONICS ENGINEERING INSTALLATION AGENCY - COMMUNICATIONS ENGINEERING DIRECTORATE DRAWINGS. The standard engineering installation drawings, STD-MX-0007 (12 sheets), TSEC/CY-104A Rack, show the necessary equipment and installation of the TSEC/CY-104A. Description and application of STD-MX-0007 drawings is as follows:

Sheet	TSEC/CY-104A
1	Bill of materials
2 and 3	Rack layout and conduit installation details
4	Rack grounding details
5	Rack interface cabling
6	Cable assembly fabrication
7 thru 10	Cable running list
11	Interconnect kit and wire installation details
12	Security curtains

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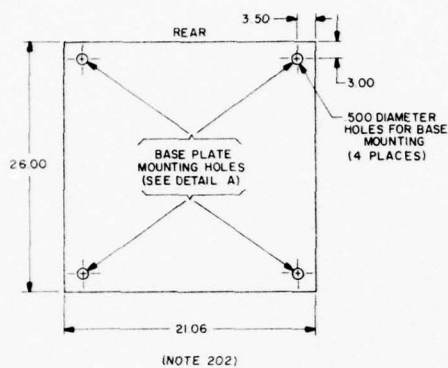
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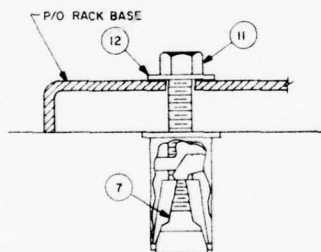
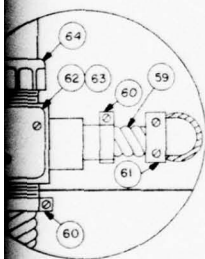
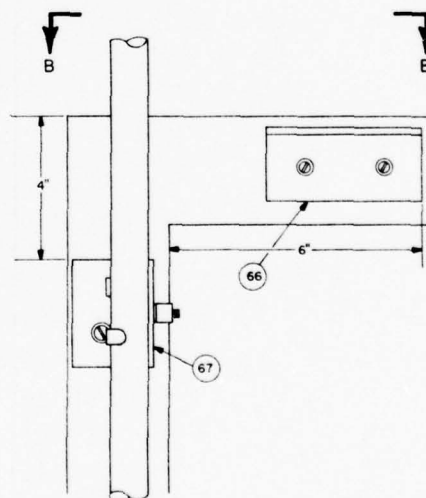
REVISION			
ZONE REV	DESCRIPTION	DATE	APPROVED
A	ADDED KG-34, DELETED NOTE 205, WAS SH 2 OF 18	15 MAY 78	10/11/78
B	GEN REV	17 OCT 78	60 12 4



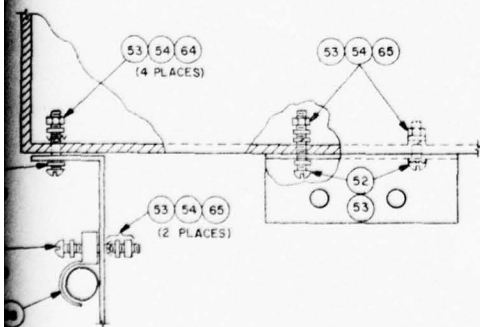
RACK BASE PLATE DIMENSIONS

## NOTES:

- 201 BRACKETS AND SCREWS, FIND NO. 21, 8 EACH ARE REQUIRED TO MOUNT TSEC/KG-34 TO RACK-ATTACH OTHER UNITS TO RACK WITH FIND NO. 27.
- 202 BOLT RACKS TO WOOD FLOOR WITH FIND NO. 31 AND 32.
- 203 TYPE OF INSTALLATION IS DETERMINED BY SITE REQUIREMENTS.
- 204 PUNCH 2 INCH HOLE FOR FIND ITEM NO. 69.

DETAIL "A"  
TYPICAL INSTALLATION OF RACK  
TO CONCRETE FLOOR

VIEW "A-A"



VIEW "B-B"

TSEC/CY-104A  
RACK LAYOUT AND CONDUIT  
INSTALLATION DETAILS

IDENT NO.	STD-MX-0007	SIZE	FSCM NO.	DRAWING NO.
DRAWN BY	B. ROBINSON	D	50470	
APPROVED BY		SCALE	NONE	1" = 1'-0"
				SHEET 2 OF 12

5

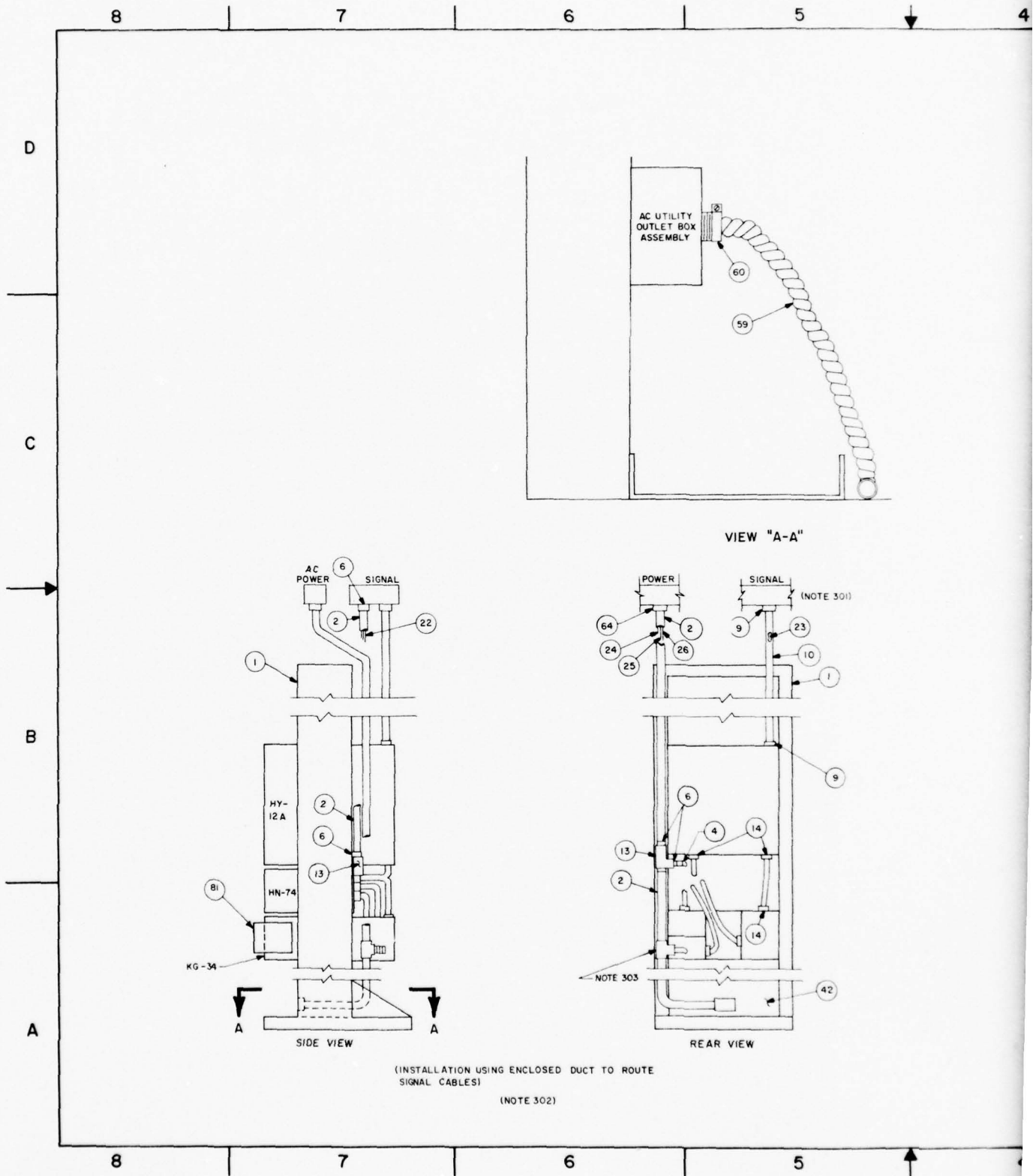
4

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2

1

2



5 4 3 2 1

REVISION			
ZONE	REV	DESCRIPTION	DATE
A		ADDED NOTE 303, ALSO, KG-34, WAS SH 3 OF 18	15 MAY 78
B		NOTE 3 - SHEET 2 WAS SHEET 1	17 OCT 78

D

C

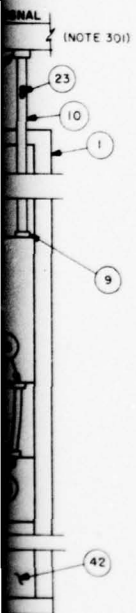
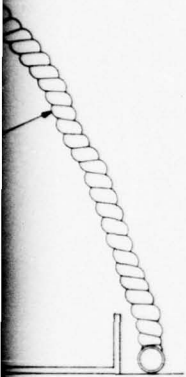
B

A

NOTES:

- 301 TRANSVERSE DUCTS ARE SHOWN FOR REFERENCE ONLY. ACTUAL DUCTS WILL BE DETERMINED BY SITE REQUIREMENTS.
- 302 TYPE OF INSTALLATION IS DETERMINED BY SITE REQUIREMENTS.
- 303 SEE SHEET NO 2 FOR DETAIL.

"A-A"



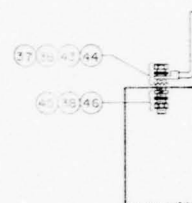
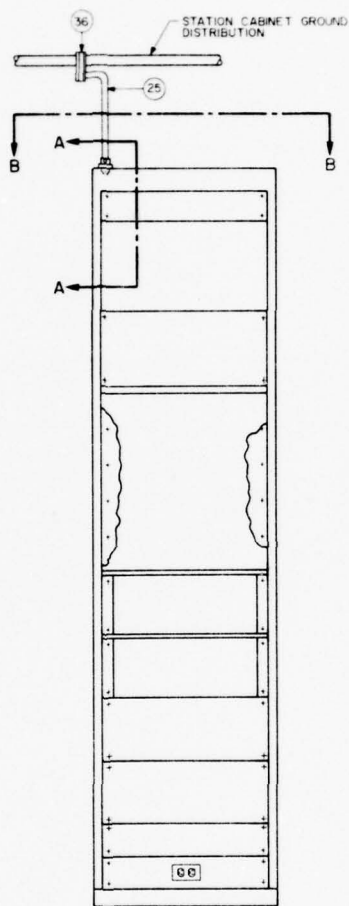
IDENT NO STD-MX-0007		SIZE D		TSCM NO 50470		DRAWING NO	
SHEET 3 OF 12							
DRAWN BY B. ROBINSON		SCALE NONE		1"		SHEET OF	
APPROVED BY							

TSEC/CY-104A  
RACK LAYOUT AND CONDUIT  
INSTALLATION DETAILS

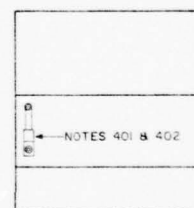
5 4 3 2 1

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[illegible]

VIEW A-A  
GROUND CONNECTION TO  
TSEC/CY-104A RACK



VIEW B-B  
LOCATION OF GROUND CONNECTION  
TO TSEC/CY-104A RACK

FIGURE 1  
TSEC/CY-104A RACK CONNECTION TO OVERHEAD  
STATION GROUND DISTRIBUTION

4

3

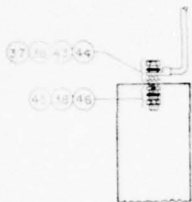
2

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REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVED
A		REVISED LOM, FIGURE 1 AND DETAIL "A-A"	2/20/78	
B		WAS SHEET 4 OF 18	15MAY78	
C		TITLE OF VIEWS TSEC/CY-104A WAS TSEC/CY-104	15OCT78	

## LEGEND:

○ LIST OF MATERIALS ITEM NUMBER

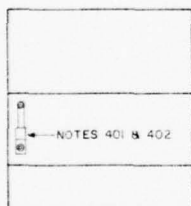


VIEW A-A

GROUND CONNECTION TO  
TSEC/CY-104A RACK

## NOTES:

401. EXACT FRONT TO REAR LOCATION WILL BE DETERMINED ON-SITE BY THE INSTALLER DEPENDING ON LOCATION OF OVERHEAD GROUND DISTRIBUTION.
402. AFTER LOCATION HAS BEEN DETERMINED DRILL 5/16-INCH HOLE TO MOUNT CONNECTOR. REMOVE PAINT AND CLEAN THE METAL SURFACE FOR A DIAMETER OF 9/16-INCH AROUND THE MOUNTING HOLE.



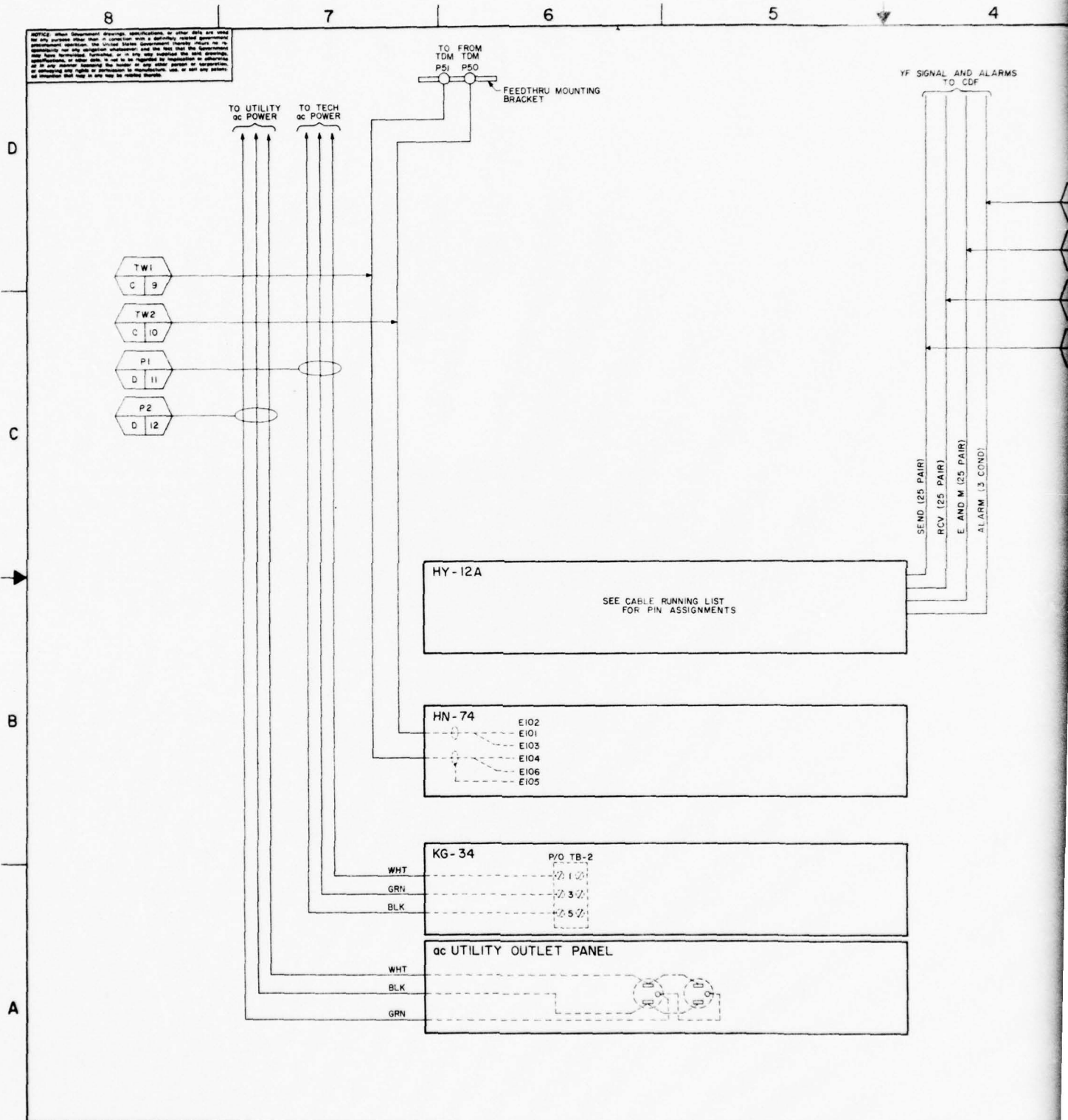
VIEW B-B

LOCATION OF GROUND CONNECTION  
TO TSEC/CY-104A RACK

ITEM	DESCRIPTION	FSN	UI	QTY			
LIST OF MATERIALS							
IDENT NO <b>STD-MX-0007</b> SHEET 4 OF 12		ORGANIZATION <b>USACEEIA-CED</b> FORT HUACHUCA, ARIZONA					
DESIGN BY <b>C.M. PACKARD</b>		TSEC/CY 104 A RACK GROUNDING DETAILS					
DRAFTSMAN <b>JMENDOZA, C.E.T.</b>							
CHECKER <b>J.M.</b>							
DATE <b>20 APRIL 1976</b>							
ORGANIZATION APPROVAL <b>J.M.</b>		CODE IDENT NO. <b>50470</b>	SIZE <b>D</b>				
APPROVAL		SCALE <b>NONE</b>	REVISION <b>A</b>	SHEET <b>4</b> OF <b>12</b>			

FORM 6047-1

NOTICE: When equipment, drawings, specifications, or other data are used in any system, it is the responsibility of the user to ensure that the equipment, drawings, specifications, or other data are used in accordance with the instructions and the fact that the Government assumes no responsibility for any damage or loss of data or equipment, or for any delay in the use of the equipment, or for any other matter arising from the use of the equipment, or for any other matter arising from the use of the equipment, or for any other matter arising from the use of the equipment.

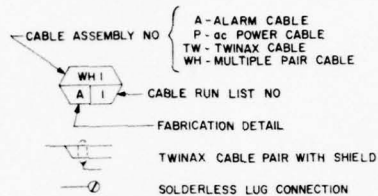


YF SIGNAL AND ALARMS  
TO CDF



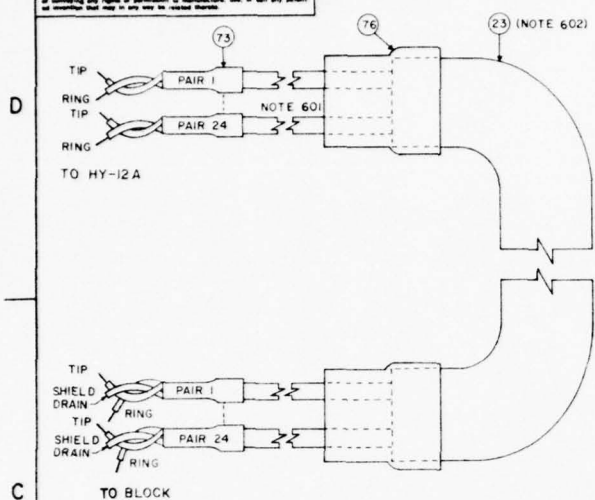
REVISIONS			
SYM	ZONE	DESCRIPTION	DATE
A		DELETED SEND AND RCV PNL, ALARM PNL	10 MAR 77
B		WAS SH 6 OF 18	23 FEB 78
C			15 MAR 78

# LEGEND:

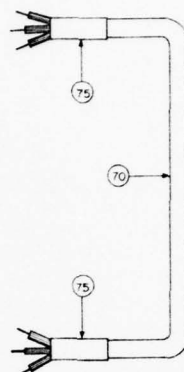


ITEM	DESCRIPTION	FSN	UI	QTY
LIST OF MATERIALS				
IDENT NO STD-MX-0007 SHEET 8 OF 12		ORGANIZATION USACEEIA-CED FORT HUACHUCA, ARIZONA		
DESIGN BY C.M. PACKARD		TSEC/CY-104A RACK INTERFACE CABLING		
DRAFTSMAN J.MENDOZA, C.E.T.				
CHECKER				
DATE 20 APRIL 1976		CODE IDENT NO 50470		
ORGANIZATION APPROVAL <i>[Signature]</i>		SIZE D		
APPROVAL <i>[Signature]</i>		SCALE NONE		
		SHEET OF		

NOTICE: When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement, the use of such data is unauthorized. It is the responsibility of the user to obtain any necessary permission from the appropriate authority. The use of such data in any manner, including the reproduction, distribution, or sale, is prohibited. The use of such data in any manner, including the reproduction, distribution, or sale, is prohibited. The use of such data in any manner, including the reproduction, distribution, or sale, is prohibited.

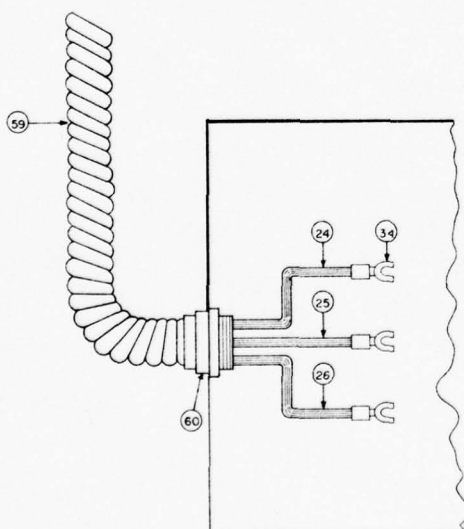


DETAIL "A"  
FABRICATION OF MULTIPLE PAIR INDIVIDUALLY SHIELDED  
CABLE FROM HY-12A TO CDF TERMINAL BLOCK



DETAIL "B"  
FABRICATION OF ALARM CABLE ASSEMBLY FROM  
RACK TERMINAL BLOCK TO HY-12A  
(1 REQUIRED)

DE  
FABRICATION OF TWIN  
FEEDTHRU MOUNT  
(2 REQUIRED)



DETAIL "D"  
FABRICATION OF AC POWER CABLE ASSEMBLY  
FROM STATION DISTRIBUTION TO KG-34  
AND TO AC UTILITY OUTLET PANEL  
(2 REQUIRED)



5

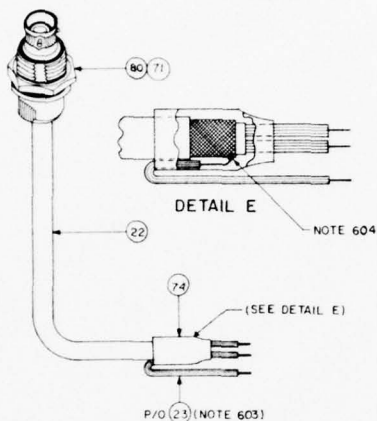
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REVISIONS				
REV	ZONE	DESCRIPTION	DATE	APPROVED
A		RELEASING DETAIL E GEN REVISIONS	2 APR 77	1000
B		ADDED NOTE 605 WAS SH 7 OF 18	15 MAY 78	1000
C		GEN REV	17 OCT 78	1000



DETAIL "C"

FABRICATION OF TWINAX CABLE ASSEMBLY FROM  
FEEDTHRU MOUNTING BRACKET TO HN-74  
(2 REQUIRED)

SEMBLY FROM  
HY-12A

## LEGEND:

← ○ LIST OF MATERIALS ITEM NUMBER

## NOTES:

- 601 CUT DRAIN WIRE AT HY-12A END.  
ENCLOSE ALL PAIRS WITHIN SHRINKABLE  
TUBING (ITEM 73)
- 602 PAIR 25 IS A SPARE PAIR THE TIP RING AND  
SHIELD DRAIN ARE TO BE CONNECTED TO THE  
BLOCK SHIELD GROUND POINT HOWEVER,  
LEAVE LEADS LONG ENOUGH TO REACH ANY  
T.R. CONNECTION ON THE BLOCK OR HY-12A  
FILTERS USED WITH ITS FUNCTION, I.E., SEND,  
REC OR E AND M
- 603 USE BLACK WIRE FROM SCRAPS OF FIND NO 23.
- 604 FIND NO 23 SOLDERS TO THE SHIELD OF THE  
TWINAX CABLE.

ITEM	DESCRIPTION	FSN	UI	QTY
LIST OF MATERIALS				
IDENT NO STD-MX-0007 SHEET 6 OF 12		ORGANIZATION USACEEIA-CED FORT HUACHUCA, ARIZONA		
DESIGN BY C.M. PACKARD		TSEC/CY-104A CABLE ASSEMBLY FABRICATIONS		
DRAFTSMAN J.MENDOZA, C.E.T.				
CHECKER				
DATE 20 APRIL 1978				
ORGANIZATION APPROVAL 2 2 77		CODE IDENT NO. SIZE 50470 D		
APPROVAL		SCALE NONE	SHEET OF	

FORM 800-101

8

7

6

5

4

D

C

B

A

WIRE RUN LIST 5				FABRICATION DETAIL A			
CABLE ASSEMBLY WH-5				CABLE OR WIRE TYPE 25 PAIR, IND SHLD, NO 24 AWG			
REFERENCE DRAWING							
FROM				TO			
LOCATION	RUN OR PAIR	CONNECTOR TYPE	ROW AND PIN NO	LOCATION	CONNECTOR TYPE	JACK AND PIN NO	NOTE
SEND BLOCK	1	T WIRE WRAP	1-A (T)	HY-12A	WIRE WRAP	FL1 (T)	
		R	1-B (R)			FL1 (R)	
	2		1-C (T)			FL2 (T)	
			1-D (R)			FL2 (R)	
	3		2-A (T)			FL3 (T)	
			2-B (R)			FL3 (R)	
	4		2-C (T)			FL4 (T)	
			2-D (R)			FL4 (R)	
	5		3-A (T)			FL5 (T)	
			3-B (R)			FL5 (R)	
	6		3-C (T)			FL6 (T)	
			3-D (R)			FL6 (R)	
	7		4-A (T)			FL7 (T)	
			4-B (R)			FL7 (R)	
	8		4-C (T)			FL8 (T)	
			4-D (R)			FL8 (R)	
	9		5-A (T)			FL9 (T)	
			5-B (R)			FL9 (R)	
	10		5-C (T)			FL10 (T)	
			5-D (R)			FL10 (R)	
	11		6-A (T)			FL11 (T)	
			6-B (R)			FL11 (R)	
	12		6-C (T)			FL12 (T)	
			6-D (R)			FL12 (R)	
	13		7-A (T)			FL13 (T)	
			7-B (R)			FL13 (R)	
	14		7-C (T)			FL14 (T)	
			7-D (R)			FL14 (R)	
	15		8-A (T)			FL15 (T)	
			8-B (R)			FL15 (R)	
	16		8-C (T)			FL16 (T)	
			8-D (R)			FL16 (R)	
	17		9-A (T)			FL17 (T)	
			9-B (R)			FL17 (R)	
	18		9-C (T)			FL18 (T)	
			9-D (R)			FL18 (R)	
	19		10-A (T)			FL19 (T)	
			10-B (R)			FL19 (R)	
	20		10-C (T)			FL20 (T)	
			10-D (R)			FL20 (R)	
	21		11-A (T)			FL21 (T)	
			11-B (R)			FL21 (R)	
	22		11-C (T)			FL22 (T)	
			11-D (R)			FL22 (R)	
	23		12-A (T)			FL23 (T)	
			12-B (R)			FL23 (R)	
SEND BLOCK	24	T WIRE WRAP	12-C (T)	HY-12A	WIRE WRAP	FL24 (T)	
		R	12-D (R)			FL24 (R)	
	25	SPARE PAIR					

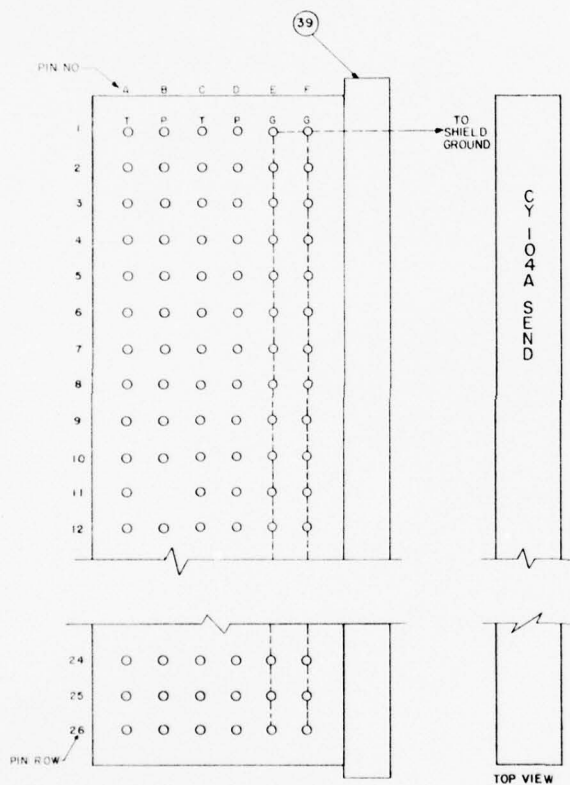
PIN NO



5 4 3 2 1

REVISION			
ZONE	REV	DESCRIPTION	DATE
A	WAS SH B OF 18		15 MAY 78
B	GEN REV		15 OCT 78

NOTE



CY 104A SEND BLOCK  
(6 x 26)

D

C

B

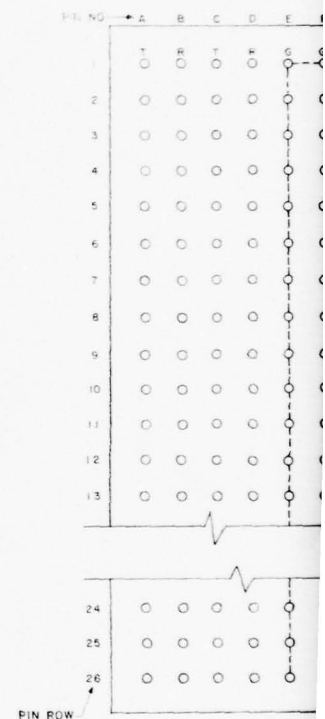
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5 4 3 2 1

TSEC/CY-104A CABLE RUNNING LIST			
IDENT NO STD-MX-0007 SHEET 7 OF 12	SIZE D	FSM NO 50470	DRAWING NO
DRAWN BY M GUNNING	APPROVED BY	SCALE NONE	SHEET OF

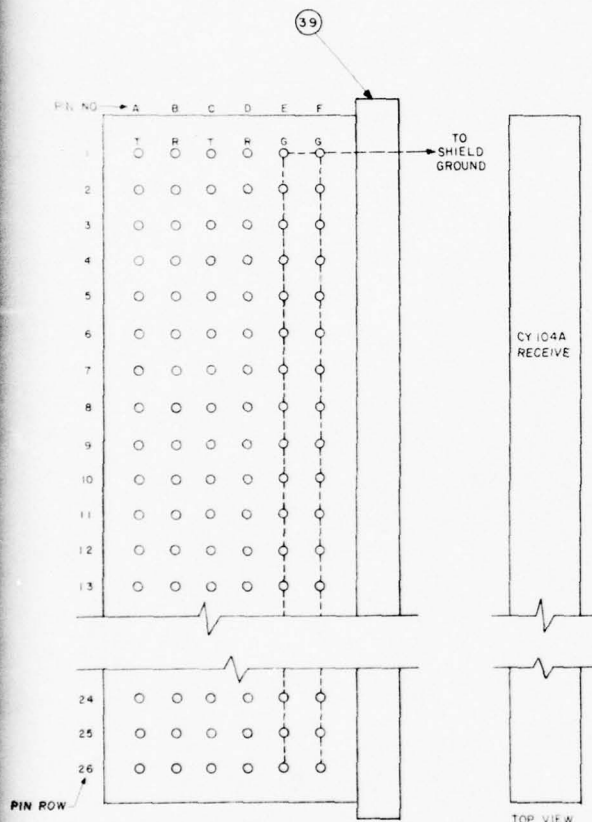
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WIRE RUN LIST 7 FABRICATION DETAIL A									
CABLE ASSEMBLY WH-7 CABLE OR WIRE TYPE 25 PAIR, IND SHLD, NO 24 AWG									
REFERENCE DRAWING									
FROM					TO				
LOCATION	RUN OR PAIR	CONNECTOR TYPE	ROW AND PIN NO.	TERMINATION DETAIL	LOCATION	CONNECTOR TYPE	JACK AND PIN NO.	TERMINATION DETAIL	NOTE
RCV BLOCK	1	T	1-A (T)		HY-12A	WIRE WRAP	FL1A (T)		
	2	R	1-B (R)				FL1A (R)		
	3		1-C (T)				FL2A (T)		
	4		1-D (R)				FL2A (R)		
	5		2-A (T)				FL3A (T)		
	6		2-B (R)				FL3A (R)		
	7		2-C (T)				FL4A (T)		
	8		2-D (R)				FL4A (R)		
	9		3-A (T)				FL5A (T)		
	10		3-B (R)				FL5A (R)		
	11		3-C (T)				FL6A (T)		
	12		3-D (R)				FL6A (R)		
	13		4-A (T)				FL7A (T)		
	14		4-B (R)				FL7A (R)		
	15		4-C (T)				FL8A (T)		
	16		4-D (R)				FL8A (R)		
	17		5-A (T)				FL9A (T)		
	18		5-B (R)				FL9A (R)		
	19		5-C (T)				FL10A (T)		
	20		5-D (R)				FL10A (R)		
	21		6-A (T)				FL11A (T)		
	22		6-B (R)				FL11A (R)		
	23		6-C (T)				FL12A (T)		
	24		6-D (R)				FL12A (R)		
	25		7-A (T)				FL13A (T)		
	26		7-B (R)				FL13A (R)		
	27		7-C (T)				FL14A (T)		
	28		7-D (R)				FL14A (R)		
	29		8-A (T)				FL15A (T)		
	30		8-B (R)				FL15A (R)		
	31		8-C (T)				FL16A (T)		
	32		8-D (R)				FL16A (R)		
	33		9-A (T)				FL17A (T)		
	34		9-B (R)				FL17A (R)		
	35		9-C (T)				FL18A (T)		
	36		9-D (R)				FL18A (R)		
	37		10-A (T)				FL19A (T)		
	38		10-B (R)				FL19A (R)		
	39		10-C (T)				FL20A (T)		
	40		10-D (R)				FL20A (R)		
	41		11-A (T)				FL21A (T)		
	42		11-B (R)				FL21A (R)		
	43		11-C (T)				FL22A (T)		
	44		11-D (R)				FL22A (R)		
	45		12-A (T)				FL23A (T)		
	46		12-B (R)				FL23A (R)		
	47		12-C (T)				FL24A (T)		
	48		12-D (R)				FL24A (R)		
RCV BLOCK	24	T	12-D (T)		HY-12A	WIRE WRAP	FL24A (T)		
	25	R	12-D (R)				FL24A (R)		



CY 10

REVISION			
ZONE	REV	DESCRIPTION	DATE
A	WAS SH 9 OF 18		15 MAY 78
B	GEN REV		16 OCT 78



CY 104A RECEIVE BLOCK  
(6 x 26)

IDENT NO STD-MX-0007		TSEC/CY-104A CABLE RUNNING LIST	
DRAWN BY M GUNNING		SIZE/PCB NO D 50470	DRAWING NO
APPROVED BY		SCALE NONE	1" SHEET OF



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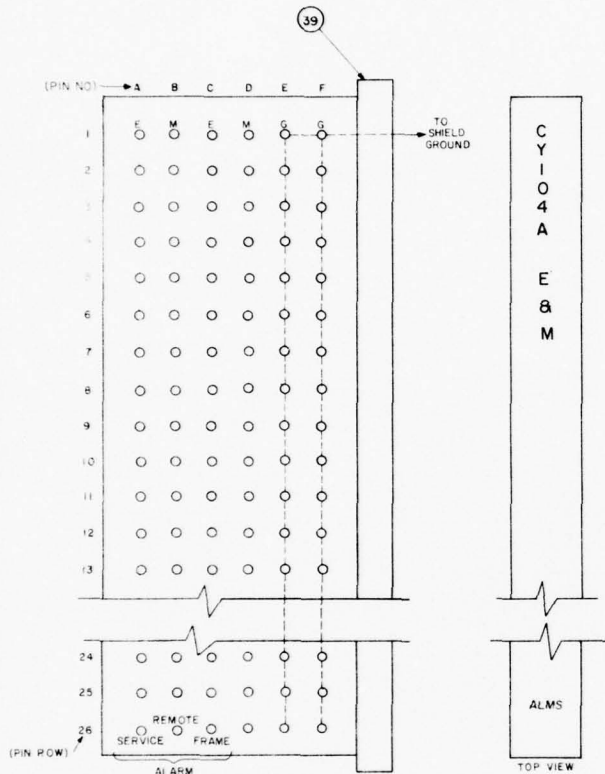
WIRE RUN LIST 7 FABRICATION DETAIL A			
CABLE ASSEMBLY WH-9 CABLE OR WIRE TYPE 25 PAIR, IND SHIELD, NO 22 AWG			
REFERENCE DRAWING			
FROM			
LOCATION	RUN OR PAIR	CONNECTOR TYPE	ROW AND PIN NO
E AND M BLOCK	1	WIRE WRAP	1-A (E)
	2		1-B (M)
	3		1-C (E)
	4		1-D (M)
	5		2-A (E)
	6		2-B (M)
	7		2-C (E)
	8		2-D (M)
	9		3-A (E)
	10		3-B (M)
	11		3-C (E)
	12		3-D (M)
	13		4-A (E)
	14		4-B (M)
	15		4-C (E)
	16		4-D (M)
	17		5-A (E)
	18		5-B (M)
	19		5-C (E)
	20		5-D (M)
	21		6-A (E)
	22		6-B (M)
	23		6-C (E)
	24		6-D (M)
	25		7-A (E)
	26		7-B (M)
	27		7-C (E)
	28		7-D (M)
	29		8-A (E)
	30		8-B (M)
	31		8-C (E)
	32		8-D (M)
	33		9-A (E)
	34		9-B (M)
	35		9-C (E)
	36		9-D (M)
	37		10-A (E)
	38		10-B (M)
	39		10-C (E)
	40		10-D (M)
	41		11-A (E)
	42		11-B (M)
	43		11-C (E)
	44		11-D (M)
	45		12-A (E)
	46		12-B (M)
	47		12-C (E)
	48		12-D (M)
E AND M BLOCK	24	WIRE WRAP	12-D (M)

TO			
LOCATION	CONNECTOR TYPE	JACK AND PIN NO	TERMINATION DETAIL
HY-12A	WIRE WRAP	FL25 (E)	
		FL25 (M)	
		FL26 (E)	
		FL26 (M)	
		FL27 (E)	
		FL27 (M)	
		FL28 (E)	
		FL28 (M)	
		FL29 (E)	
		FL29 (M)	
		FL30 (E)	
		FL30 (M)	
		FL31 (E)	
		FL31 (M)	
		FL32 (E)	
		FL32 (M)	
		FL33 (E)	
		FL33 (M)	
		FL34 (E)	
		FL34 (M)	
		FL35 (E)	
		FL35 (M)	
		FL36 (E)	
		FL36 (M)	
		FL37 (E)	
		FL37 (M)	
		FL38 (E)	
		FL38 (M)	
		FL39 (E)	
		FL39 (M)	
		FL40 (E)	
		FL40 (M)	
		FL41 (E)	
		FL41 (M)	
		FL42 (E)	
		FL42 (M)	
		FL43 (E)	
		FL43 (M)	
		FL44 (E)	
		FL44 (M)	
		FL45 (E)	
		FL45 (M)	
		FL46 (E)	
		FL46 (M)	
		FL47 (E)	
		FL47 (M)	
		FL48 (E)	
		FL48 (M)	

CY-104A E AND M  
(6x2)

WIRE RUN LIST 13 FAB			
CABLE ASSEMBLY A-1 CAB			
REFERENCE DRAWING			
FROM			
LOCATION	COLOR	CONNECTOR TYPE	ROW AND PIN NO
E AND M CDF BLOCK	GREEN	SOLDER	26-A
	RED		26-B
E AND M CDF BLOCK	YELLOW	SOLDER	26-C

REVISION				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	WAS SH IO OF IB	15 MAY 78	
	B	GEN REV	15 OCT 78	WTF



NOTES:  
 901 SERVICE ALARM  
 902 REMOTE ALARM  
 903 FRAME ALARM

CY-104A E AND M, ALM BLOCK  
 (6x26)

WIRE RUN LIST 13 FABRICATION DETAIL B

CABLE ASSEMBLY A-1 CABLE OR WIRE TYPE 3 COND. NO 22 AWG

REFERENCE DRAWING

FROM				
LOCATION	COLOR	CONNECTOR TYPE	ROW AND PIN NO	TERMINATION DETAIL
AND M CDF BLOCK	GREEN	SOLDER	26 - A	
↑				
	RED		26 - B	
↑				
AND M CDF BLOCK	YELLOW		26 - C	
		SOLDER		

TO				
LOCATION	CONNECTOR TYPE	JACK AND PIN NO	TERMINATION DETAIL	NOTE
HY-12A	SOLDER	FL 49		901
↑	↑			
		FL 50		902
↑	↑			
		FL 51		903
HY-12A	SOLDER			

IDENT NO <b>STD-MX-0007</b>		SIZE <b>D 50470</b>		DRAWING NO	
SHEET 2 OF 12		SCALE <b>NONE</b>		SHEET 2 OF 12	
DRAWN BY <b>M GUNNING</b>		APPROVED BY			

TSEC/CY-104A  
 CABLE RUNNING LIST

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WIRE RUN LIST 9

FABRICATION DETAIL C

CABLE ASSEMBLY TW-1

CABLE OR WIRE TYPE TWINAX, 78 OHM

FROM					TO				
LOCATION	RUN OR PAIR	CONNECTOR TYPE	JACK AND PIN NO	TERMINATION DETAIL	LOCATION	CONNECTOR TYPE	JACK AND PIN NO		NOTE
HN-74	1	SOLDER	E104		FEED THRU MTG	CONCENTRIC	P-51		
			E106	CONNECT SHLD	BRACKET TOP	TWINAX			
				EXTENSION TO	OF CY-104 RACK				
				E105					

C

WIRE RUN LIST 10

FABRICATION DETAIL C

CABLE ASSEMBLY TW-2

CABLE OR WIRE TYPE TWINAX, 78 OHM

FROM					TO				
LOCATION	RUN OR PAIR	CONNECTOR TYPE	JACK AND PIN NO	TERMINATION DETAIL	LOCATION	CONNECTOR TYPE	JACK AND PIN NO		NOTE
HN-74	1	SOLDER	E101		FEED THRU MTG	CONCENTRIC	P-50		
			E103	DO NOT	BRACKET TOP	TWINAX			
				GROUND	OF CY-104 RACK				
				SHIELD OF					
				T1 RECEIVE					
				CABLE AT					
				HN-74					

NOTE 1002

B

WIRE RUN LIST 11

FABRICATION DETAIL D

CABLE ASSEMBLY P-1

CABLE OR WIRE TYPE SOLID, INS, NO. 12 AWG (3)

FROM					TO				
LOCATION	RUN OR PAIR	CONNECTOR TYPE	JACK AND PIN NO	TERMINATION DETAIL	LOCATION	CONNECTOR TYPE	JACK AND PIN NO		NOTE
KG-34	1	SCREW TERM	TB-2,1		STATION TECH				1001
	(WHT)				AC PWR DISTR				1001
	2		TB-2,3						
	(GRN)				STATION TECH				1001
KG-34	3	SCREW TERM	TB-2,5		AC PW DISTR				
	(BLK)								

(SEE DWG SHEET 5)

A

WIRE RUN LIST 12

FABRICATION DETAIL D

CABLE ASSEMBLY P-2

CABLE OR WIRE TYPE SOLID, INS, NO. 12 AWG (3)

FROM					TO				
LOCATION	RUN OR PAIR	CONNECTOR TYPE	JACK AND PIN NO	TERMINATION DETAIL	LOCATION	CONNECTOR TYPE	JACK AND PIN NO		NOTE
AC UTILITY OUTLET PANEL	1	SCREW TERM	"HOT"	NONE	STATION UTLY				1001
	(WHT)				AC PWR DISTR				1001
	2		AC NEUTRAL						
	(BLK)				STATION UTLY				1001
AC UTILITY OUTLET PANEL	3	SCREW TERM	AC PROT	NONE	AC PWR DISTR				
	(GRN)								

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REVISION			
ZONE	REV	DESCRIPTION	DATE
	A	WAS SH 11 OF 18	15 MAY 78
	B	GEN REV	13 OCT 78

D

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## NOTES:

1001. CONNECTION DETAILS TO THE STATION AC POWER DISTRIBUTION  
WILL BE PROVIDED IN THE STATION EIP.

1002. DETAIL DRAWINGS ARE ON SHEET 6.

OHM

NOTE

OHM

NOTE

NOTE 1002

NO. 12 AWG (3)

NOTE

1001

1001

1001

(SEE DWG SHEET 5.)

NO. 12 AWG (3)

NOTE

1001

1001

1001

IDENT NO. STD-MX-0007		SIZE D		FSCW NO. 50470		DRAWING NO.	
SHEET 10 OF 12		SCALE NONE		1"		SHEET OF	
DRAWN BY M GUNNING		APPROVED BY		ENTERED IN DATABASE		108	

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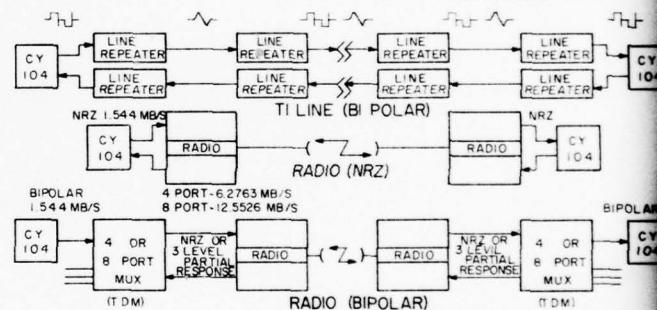
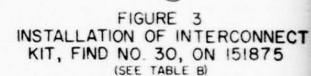
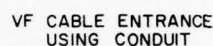
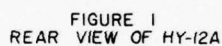


FIGURE 4  
TYPICAL TRANSMISSION SYSTEMS  
(FOR INFORMATION ONLY)

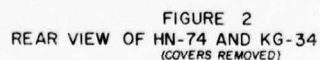
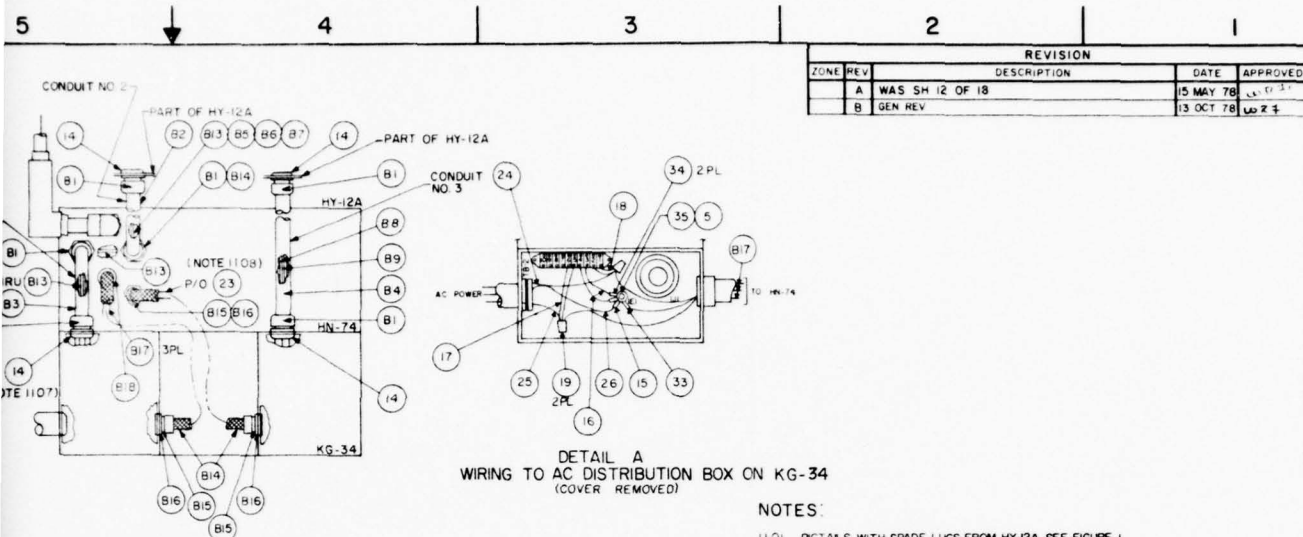


TABLE A-1: INTERCONNECTING CABLES & PIN FUNCTIONS									
FUNCTIONS		CABLE C/N	EQUIP	FROM	TERM	EQUIP	TO		
AC POWER	HOT	B7 C/N	AC	CIRCUIT	BREAKER	KG-34	TB 2-5	TB 2-6	
	NEUTRAL GROUND		KG-34			TB 2-1	TB 2-2		
			DIST BOX			KG-34	IE1		
TI RECEIVE (NRZ)			TI PATCH	(NOTE 1109)		HN-74	J107		
TI TRANSMIT (NRZ)			TI PATCH	(NOTE 1109)		HN-74	J108		
AUDIO INPUT			IDF			HY-12A	FL1 THRU FL 24		
AUDIO OUTPUT			IDF			HY-12A	FL 25 THRU FL 48		
E & W SIGNALING			IDF			HN-74	E10(T1P), E03(ORING)		
TI RECEIVE (BI POLAR)			TI PATCH	(NOTES 1104, 1109)		HN-74	E10(T1P), E10G(ORING)		
TI TRANSMIT (BI POLAR)			TI PATCH	(NOTES 1104, 1109)					
+4VDC			HY-12 A	FL 63			TB 101-1		
-12 VDC			FL 62				TB 101-2		
+12 VDC			FL 51				TB 101-3		
-48 VDC			FL 53				TB 101-4		
GROUND			GROUND				TB 101-5		
ALARM			FL 57				TB 102-1		
RECEIVE CLOCK NO 1		(NOTE 1102)	FL 54			HN-74	J104		
DIGIT OUT			FL 55				J105		
TRANSMIT CLOCK			FL 56				J106		
RECEIVE DATA			FL 58			KG-34	TB 1-5, 5HTB1-6		
TRANSMIT DATA			FL 59				J12, P51		
RECEIVE CLOCK NO 2			FL 60				A4, P51		
RECEIVE DATA			HN-74	J102			TB1-1, 5HTB1-2		
TRANSMIT PREP				J103			TB1-3, 5HTB1-4		
END ORDER PREP				J106			TB1-7, 5HTB1-8		
				HN-74	TB 102-3		TB4-10		
				HN-74	TB 102-5		TB4-12		
							KG-34		
			</						

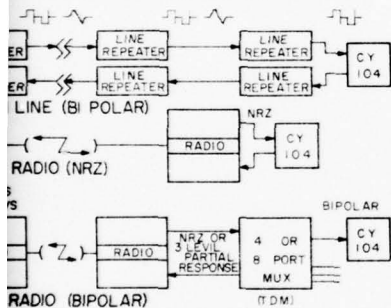
TABLE A





#### NOTES:

- 1101: PIGTAILS WITH SPADE LUGS FROM HY-12A. SEE FIGURE 1.
- 1102: THESE CABLES ARE PART OF INTERCONNECT KIT, FIND NO. 30. FIND NO'S FROM TABLE B SHOWN IN CABLE C/N COLUMN.
- 1103: REMOVE JUMPERS FROM A14 J2 & A12 J2 TO TB3. REMOVE BNC CONNECTOR FROM EACH JUMPER AND INSTALL ON CABLES, FIND NUMBERS B8 & B9 (SEE TABLE A).
- 1104: GROUND SHIELD OF T1 TRANSMIT CABLE AT E105 ON HN-74. GROUND SHIELD OF T1 RECEIVE CABLE AT TDM DO NOT GROUND SHIELD OF T1 RECEIVE CABLE AT HN-74.
- 1105: TO OPERATE COOLING FAN IN HY-12 CONNECT FACTORY INSTALLED WIRES FROM FL64 TO J113 IN HN-74.
- 1106: TERMINATIONS OF CABLES ARE MARKED ON CABLES. CABLES ARE PROVIDED WITH BNC CONNECTORS EXCEPT AT INDICATED IN NOTE 1103.
- 1107: BUSHING, FIND NO. 14, IS PLACED ON EACH BOX CONNECTOR, FIND NO. B1, TO PROTECT WIRES.
- 1108: USE THE BLACK WIRE FROM SCRAP LENGTHS OF FIND NO. 23.
- 1109: TO DETERMINE IF BIPOLAR OR NRZ SIGNALLING IS TO BE USED REFER TO FIGURE 4.



TABLES & PIN FUNCTIONS			
TERM	EQUIP	TO	TERM
CIRCUIT BREAKER	KG-34	TB 2-5 & TB 2-6	
	KG-34	TB 2-1 & TB 2-2	
	KG-34	IE1	
(NOTE 1109)	HN-74	J107	
(NOTE 1109)	HN-74	J108	
NOTES 1104, 1109 NOTES 1104, 1109 FL 63 FL 62 FL 51 FL 53 GROUND FL 57 FL 54 FL 55 FL 56 FL 58 FL 59 FL 60 1102 1103 1105 TB 102-3 TB 102-5	HY-12A	FL 1 THRU FL 24	
	HY-12A	FL 1A THRU FL 24A	
	HY-12A	FL 25 THRU FL 48	
	HN-74	E101(TIP), E103(RING)	
	HN-74	E104(TIP), E106(RING)	
	HN-74	TB 101-1	
		TB 101-2	
		TB 101-3	
		TB 101-4	
		TB 101-5	
FL 101A FL 101C FL 101B,D J113-2 J113-10	J101	TB 102-1	
	J101	J104	
	J101	J105	
	HN-74	TB 1-5, SH TB 1-6	
	KG-34	A12, P2 NOTE 1103	
		A14, P2 SH TB 1-2	
		TB 1-3, TB 1-4	
		TB 1-7, TB 1-8	
		TB 4-10	
		TB 4-12	
FL 101A FL 101C FL 101B,D	KG-34	TB 2-5, TB 2-6	
		TB 2-1, TB 2-2	
		IE1, TB 2-3, TB 2-4	
J113-2	HY-12A	FL 64 (UPPER) (ORG)	
J113-10		FL 64 (LOWER) (BRN)	

TABLE A

TABLE B INTERCONNECT KIT-ON 151875 ITEM # 30				
FIND NO.	NOTE	DESCRIPTION	PART NO.	QTY
B18		CONNECTOR	MS-3064-HS-25	1
B17		WIRE 16 AWG	ON 182789	3
B16		NUT 3/4"-20 LOCK	ON 182788	3
B15		CONNECTOR ELEC. BOX	ON 182787	3
B14		ASSY, FLEX 3/8" I.D. CABLE	ON 182785	2
B13	1106	CABLE 27" COAX	ON 182786-6	1
B12		27"	ON 182786-5	1
B11		24"	ON 182786-4	1
B10		26"	ON 182786-3	1
B9		24"	ON 182786-2	1
B8		24"	ON 182786-1	1
B7		26"	ONO 47876-5	1
B6		26"	ONO 47876-3	1
B5	1106	CABLE 26" COAX	ONO 47876-1	1
B4		(PREFORMED) EMT 3/4"	ONO 47899	1
B3		(PREFORMED) EMT 3/4"	ONO 47898	1
B2		(PREFORMED) EMT 3/4"	ONO 47897	1
B1	1107	CONNECTOR EMT STR 3/4" BOX	ONO 47751	6

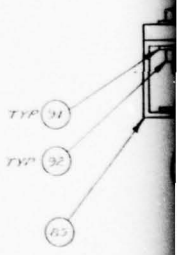
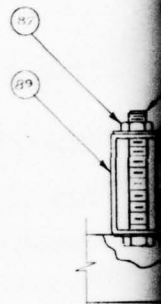
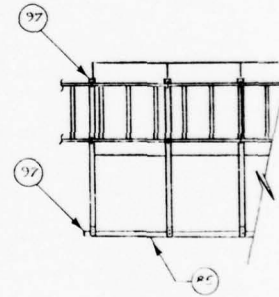
TSEC/CY-104A  
INTERCONNECT KIT AND  
WIRE INSTALLATION DETAILS

IDENT. NO. STD-MX-0007	SIZE D 50470	DRAWING NO.
DRAWN BY B. KILGORE	SCALE NONE	SHEET OF
APPROVED BY		

**A** **B** **C** **D**

VIEW A-A

VIEW B-B



5

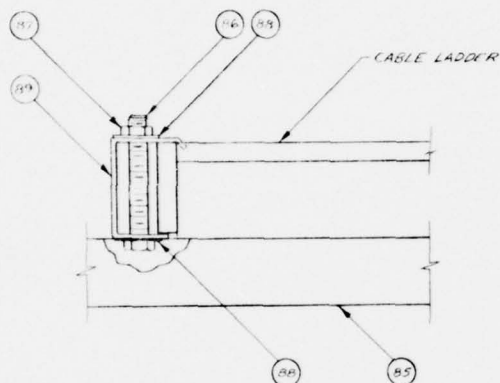
4

3

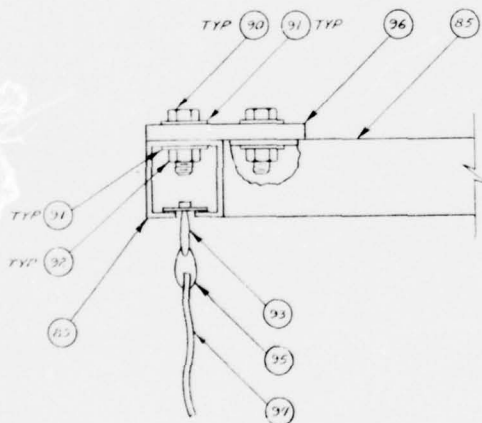
2

1

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVED
A		DELETED LOM, CHANGED BALLOON CALLOUTS	27/20/78	
B		REVISED SH 12 OF 12	27/20/78	



DETAIL C



DETAIL D

LIST OF MATERIALS			
IDENT NO. STD-MX-0007	ORGANIZATION USACEEIA-CED		
SHEET 12 OF 12	FORT HUACHUCA, ARIZONA		
DESIGN BY D. MASON	TSEC/CY-104A SECURITY CURTAIN		
DRAFTSMAN Bill P. Day			
CHECKER [Signature]			
DATE 2 AUGUST 1976	CODE IDENT NO. 50470	SIZE D	
ORGANIZATION APPROVAL CCC CED XEM	SCALE NONE	REVISION A	SHEET 12

D

C

B

A

7

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#### SECTION 5. BILL OF MATERIALS

5.1 GENERAL. The bill of materials (BOM) provided on sheet 1 of 12, STD-MX-0007, will be used to order the materials necessary to accomplish the installation of the equipment described in this SEIP.

5.2 AUTHORIZED EQUIPMENT LIST. The BOM consists of materials current with the authorized equipment list (AEL) and publication of this document. Justified changes to the BOM will be submitted to HQ USACEEIA for update. Identification of items are primarily by AEL identification and national stock number (NSN). When the latter numbers are not available, the manufacturer's part description and number or catalog number with appropriate cost will be provided.

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## SECTION 6. QUALITY ASSURANCE

### 6.1 GENERAL.

6.1.1 Quality assurance evaluation criteria. This quality assurance (QA) inspection will be implemented in accordance with CCR 702-1-2, USACC Quality Assurance Program for Engineering, Installation, and Acceptance of Communications-Electronics Equipment and Systems. The procedures in this section will be used to inspect the completed facilities with the results used to (1) determine the quality and capability of the installed hardware and equipment, and that the installed equipment provides and fulfills all requirements specified in sections 3, 4, and 7; and (2) identify, isolate, and recommend resolutions to discrepancies, and to conduct inspections and reevaluations to determine the adequacy of the system.

6.1.2 Amendments. This plan may be amended by the officially designated quality assurance representative (QAR), where necessary to meet local requirements or contingencies. Amendments which do not reflect changes in USACEEIA QA policy do not require prior concurrence or approval of USACEEIA, Test and Evaluation Directorate. Copies of all amendments must be forwarded to Commander, USACEEIA, ATTN: CCC-TED-QA, Fort Huachuca, Arizona 85613.

6.2 RESPONSIBILITIES. Quality Control (QC) procedures will be planned, established, and implemented to ensure the installation meets applicable installation standards. Procedures shall include the designation of quality control representatives (QCR) to provide continuous onsite surveillance of the installation efforts. Reports of the extent, scope, and findings of the QC inspections shall be provided to the installation supervisor for corrective actions.

### 6.2.1 Quality assurance procedures.

6.2.1.1 Inspection responsibilities. USACEEIA Test and Evaluation Directorate will assign a QAR to conduct inspections and evaluate the installation, to include compliance with installation standards and adequacy of the installation's QC program. QC inspections will be progressively at the 25 percent, 50 percent, 75 percent, and 90 percent completion points. Upon completion of the installation and prior to acceptance testing, the QAR will perform final QA inspection. Reports of inspections, findings, and corrective actions will be



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prepared and distributed as specified in 6.3. Where inadequacies are identified, the QAR and QCR will ensure that prompt initiation of appropriate corrective action is taken.

6.2.1.2 Inspection guidelines and phasing. The QC checklist, discussed below, will be used as a general inspection guide and final inspection record. This checklist is not restrictive, and the QAR may delete nonapplicable items or investigate other areas not normally concerned. The QC inspection shall be performed in the following phases:

a. Phase I. Cognizant agency, command, and facility points of contact. Figure 6-1 shall be completed before beginning any formal inspections. This figure will become a part of the permanent records.

b. Phase II. Preparations for the visual, mechanical, electrical, and operational inspections of the Communications-Electronics equipment and facilities. Preparations shall be made by obtaining a copy of the site plans, specifications, and drawings. These copies shall be used to mark and identify discrepancies. Any discrepancies shall be noted with green markings to record deletions of equipment or cables, or changes in schematic diagrams. All additions shall be noted with red markings. Notes to the draftsman will be in blue.

c. Phase III. Inspections during installation. The site engineering plans and CCTM 105-50-21 shall be the referenced technical material for the inspection of sites. Inspections during installation consist of thorough visual and mechanical reviews of the C-E equipment during the installation of the equipment, along with inspection of the facility where the C-E equipment is located, and all applicable ancillary factors. The ancillary factors consist of power system installation and the locations of ducting and conduit; the placement of C-E equipment in the facility; and the location and appearance of all fixed test, measuring, alarm, and system status equipment and indicators.

d. Phase IV. Final QC inspection. The final QC inspection shall be conducted in accordance with the foregoing procedures and the QA checklist, figure 6-2. The QC checklist is used as a guide to call to the QA inspectors' attention to, and provides a means whereby QCR's have their attention forced on the C-E equipment elements and functions inherent in the systems and sites.

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COGNIZANT AGENCY, COMMAND, AND FACILITY  
POINTS OF CONTACT

	<u>Phone No.</u>	<u>Bldg. No.</u>	<u>Rm. No.</u>
<u>Installation:</u>			
Team Leader _____	_____	_____	_____
Assistant Team Leader _____	_____	_____	_____
<u>Quality Assurance:</u>			
Coordinator _____	_____	_____	_____
Alternate Coordinator _____	_____	_____	_____

Figure 6-1. Sample of Cognizant Agency, Command,  
and Facility Points of Contact.

## FINAL QUALITY ASSURANCE INSPECTION CHECKLIST

Project Name \_\_\_\_\_ Site \_\_\_\_\_

QUALITY ASSURANCE OF EQUIPMENT INSTALLATION

(Refer to paragraphs as listed below in CCTM 105-50-21.)

	<u>YES</u>	<u>NO</u>	<u>N/A</u>
A. <u>Installation, drawings and specifications.</u> (Para 3-2, 3-3)			
1. Are floor plan drawings available?	_____	_____	_____
2. Are equipment location drawings available?	_____	_____	_____
3. Are face layout drawings of equipment in bays available?	_____	_____	_____
4. Are drawings for distributing frame block assignments available?	_____	_____	_____
5. Are pin connections on terminal blocks shown on drawings?	_____	_____	_____
6. Is stenciling of terminal blocks shown on drawings?	_____	_____	_____
7. Are drawings of power distributing equipment available?	_____	_____	_____
8. Are wire sizes indicated on drawings?	_____	_____	_____
9. Are schematic diagrams of circuit types to be installed included in drawings?	_____	_____	_____
10. Are drawings of site grounding systems available?	_____	_____	_____
11. Are drawings showing arrangement of cable racks, ducts, and trenches available?	_____	_____	_____

Figure 6-2. Sample of Final Installation Inspection Checklist (sheet 1 of 11).

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	<u>YES</u>	<u>NO</u>	<u>N/A</u>
12. Do specifications contain list of reference material required by installers?	___	___	___
13. Do specifications contain cable running list for power distribution?	___	___	___
14. Do specifications contain cable running list for signal cabling?	___	___	___
15. Do specifications contain cable running list for cabling?	___	___	___
16. Do specifications contain detailed information on grounding?	___	___	___
17. Do specifications contain details on all special instructions for installers?	___	___	___
18. Do drawings reference all applicable items on BOM?	___	___	___
B. <u>Installation Tools.</u> (Para 3-8)			
1. Is equipment damaged or unserviceable?	___	___	___
2. Are all installation materials on hand and serviceable?	___	___	___
3. Are all tools necessary for completion of the job on hand?	___	___	___
4. Is all test equipment needed for test and checkout of installation available?	___	___	___
C. <u>General Safety Practice.</u> (Chapter 4)			
1. Are goggles being worn when drilling and grinding?	___	___	___

Figure 6-2. Sample of Final Installation Inspection Checklist (sheet 2 of 11).

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	<u>YES</u>	<u>NO</u>	<u>N/A</u>
2. Are sharp edges left on frame or duct work?	---	---	---
3. Are all hand tools properly used?	---	---	---
4. Are electric power tools properly grounded?	---	---	---
D. <u>Floor Plan Layout.</u> (Para 3-7)			
1. Are equipment layout plans in accordance with drawings?	---	---	---
2. Was layout plan completed before equipment was moved into area?	---	---	---
E. <u>Erecting and Mounting.</u> (para 3-9)			
1. Is equipment laid out in accordance with floor plan drawing?	---	---	---
2. Are equipment bays level and plumbed within tolerances?	---	---	---
3. Has proper spacing been provided between equipment racks?	---	---	---
4. Are base angles of frames secured to floor in proper location?	---	---	---
5. Are all cabinets flush mounted and plumbed?	---	---	---
6. Has finish of equipment, cabinets, and racks been touched up?	---	---	---
7. Are bolts and screws free from stripped threads and defaced heads?	---	---	---

Figure 6-2. Sample of Final Installation Inspection Checklist (sheet 3 of 11)



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	<u>YES</u>	<u>NO</u>	<u>N/A</u>
8. Have sufficient clearances been provided between apparatus for heat dissipation?	___	___	___
9. Are terminal blocks aligned on distributing frames?	___	___	___
10. Has equipment been installed in cabinets or racks in accordance with face layouts?	___	___	___
11. Are all nuts and bolts securely tightened?	___	___	___
12. Are exposed or cut ends of metal filed smooth and painted?	___	___	___
13. Have lock and flat washers been used?	___	___	___
14. Is the C-E equipment BOM available at the facility?	___	___	___
15. Has the C-E equipment been inventoried and discrepancies posted?	___	___	___
16. Is all required C-E equipment at the site?	___	___	___
17. Is all C-E equipment installed?	___	___	___
F. <u>Cable Racks.</u> (Para 3-10) (Inspect new installation)			
1. Location of cable racks:			
a. Are cable racks located in accordance with cable plan drawing?	___	___	___
b. Does height of cable racks conform to height above floor as indicated on cable plan drawing?	___	___	___
c. Are cable racks located so that clearance is provided for installation and maintenance of ultimate equipment?	___	___	___

Figure 6-2. Sample of Final Installation Inspection Checklist (sheet 4 of 11).

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	<u>YES</u>	<u>NO</u>	<u>N/A</u>
d. Are cable racks located so cables are not subject to damage, exposure, or other detrimental conditions?	_____	_____	_____
2. Assembly of cable racks:			
a. Are long sections of cable racks used where possible?	_____	_____	_____
b. Have clamping details been altered where necessary to avoid interference?	_____	_____	_____
c. Are open ends of cable racks properly closed?	_____	_____	_____
d. Are vertical cable racks properly terminated on floors?	_____	_____	_____
3. Support of cable racks:			
a. Are cable racks properly supported and fastened?	_____	_____	_____
b. Are cable racks installed so no excessive load or binding is imposed on the equipment?	_____	_____	_____
c. Are horizontal cable racks supported on approximately 5-foot centers but not to exceed 6 feet?	_____	_____	_____
d. Has support been provided within 3 feet of free end of cable rack?	_____	_____	_____
e. Are cable racks braced where necessary to prevent sway?	_____	_____	_____
G. <u>Cabling Practices.</u> (Para 3-11)			
1. Are cable runs made in accordance with cable running list?	_____	_____	_____

Figure 6-2. Sample of Final Installation Inspection Checklist (sheet 5 of 11).

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	<u>YES</u>	<u>NO</u>	<u>N/A</u>
2. Are cables twisted or crossed on cable rack?	---	---	---
3. Do cables conform to the bending radii and position? (See table 3-1, page 3-55, and figures 3-55 and 3-56, page 3-56.)	---	---	---
4. Is protection provided where cable sheaths contact rough or sharp edges or metal?	---	---	---
5. Are cables which are turned off over side of cable racks formed with minimum allowable radii? (See Table 3-1, page 3-55.)	---	---	---
6. Are cables turned off rack horizontally and then up?	---	---	---
7. Do cables to the distributing frame enter on the vertical side?	---	---	---
8. Are cables serving the horizontal side of a distributing frame secured to the transverse arms near the vertical upright?	---	---	---
9. Are cable tags properly prepared and in accordance with the cable running list?	---	---	---
10. Are cable tags secured at each end of cable run?	---	---	---
11. Have cable tags been removed upon completion of verification and termination?	---	---	---
12. Are cable butts located as near as practicable to the point where the first wires turn out?	---	---	---

Figure 6-2. Sample of Final Installation Inspection Checklist (sheet 6 of 11).

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	<u>YES</u>	<u>NO</u>	<u>N/A</u>
13. Are cable butts properly treated?	—	—	—
14. Is insulation of wires undamaged at butt location?	—	—	—
15. Are unused and spare wires protected at butt location?	—	—	—
 H. <u>Securing Cables.</u> (Para 3-13)			
1. Is starting stitch properly made and placed?	—	—	—
2. Is required Kansas City stitch properly made?	—	—	—
3. Are first and succeeding layers of cable properly secured?	—	—	—
4. Are cables secured at every cable rack cross strap?	—	—	—
5. When cable butt is between securing devices, are cables secured together with an appropriate stitch?	—	—	—
6. Are lock stitches properly made and spaced?	—	—	—
7. Are splices in twine properly made?	—	—	—
 I. <u>Sewed Forms.</u> (Para 3-14)			
1. Is proper size twine used for the diameter of the form?	—	—	—
2. Are proper number of strands used?	—	—	—
3. Are stitches properly spaced?	—	—	—

Figure 6-2. Sample of Final Installation Inspection Checklist (sheet 7 of 11).

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	<u>YES</u>	<u>NO</u>	<u>N/A</u>
J. <u>Butting and Stripping.</u> (Para 3-15)			
1. Are proper tools used for butting and stripping of cable?	---	---	---
2. Are cable butts properly dressed?	---	---	---
3. Is proper distance maintained from cable butt to fanning strip?	---	---	---
K. <u>Fanned Forms.</u> (Para 3-16)			
1. Are cables fanned and connected to the left side of verticle mounted terminal blocks and to the bottom of horizontal terminal blocks?	---	---	---
2. Are conductors in fanned forms twisted and bunched?	---	---	---
3. Are fanned forms straight and taut from butt location to fanning strip?	---	---	---
4. Is length of skimmers correct?	---	---	---
5. Has color code been properly followed?	---	---	---
6. Are spare wires disposed of properly?	---	---	---
L. <u>Stenciling.</u> (Para 3-17)			
1. Is equipment correctly identified and stenciled in accordance with floor plan drawings?	---	---	---
2. Are designations located correctly?	---	---	---
3. Are correct size designations used on particular types of apparatus or equipment?	---	---	---

Figure 6-2. Sample of Final Installation Inspection Checklist (sheet 8 of 11).



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	<u>YES</u>	<u>NO</u>	<u>N/A</u>
M. <u>Strapping.</u> (Para 3-18)			
1. Are straps properly placed?	___	___	___
2. Is correct type of strap wire used?	___	___	___
3. Does insulation extend to terminal?	___	___	___
4. Are straps placed not to interfere with operation of apparatus?	___	___	___
5. Is removal of apparatus blocked?	___	___	___
6. Are designations of apparatus obscured?	___	___	___
N. <u>Connecting and Soldering.</u> (Para 3-19)			
1. Is soldering clamp used when connecting wires?	___	___	___
2. Are connections made on terminal blocks in proper manner?	___	___	___
3. Is all soldering done with standard rosin core solder?	___	___	___
4. Are connections secure and free of foreign substances?	___	___	___
5. Has all unsightly flux and excess globules of solder been removed?	___	___	___
6. Is insulation on skimmers free of burn or other damage?	___	___	___
7. Do skimmers on connected terminals exceed 1/16 of an inch?	___	___	___
8. Are all conductors given a continuity test after connection is made?	___	___	___

Figure 6-2. Sample of Final Installation Inspection Checklist (sheet 9 of 11).

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	<u>YES</u>	<u>NO</u>	<u>N/A</u>
O. <u>Wrapped Connections.</u> (Para 3-20)			
1. Are wrapped connections applied only on suitable terminals?	___	___	___
2. Are connections essentially straight and free of angular bends or crimps?	___	___	___
3. Are the required number of turns in contact with the terminal in accordance with criteria for gage of wire used? (22G-5 turns; 24G-6 turns; 26G-8 turns.)	___	___	___
4. Are wrapped connectors soldered where applicable?	___	___	___
P. <u>Cross Connections.</u> (Para 3-21)			
1. Are jumpers properly routed at distributing frame?	___	___	___
2. Do jumpers have sufficient slack after connection?	___	___	___
3. Are conductors twisted between fanning strip and terminal?	___	___	___
4. Does twist remain in conductors beyond rear of fanning strip?	___	___	___
5. Are jumpers properly dressed?	___	___	___
6. Has excess solder been removed from terminals?	___	___	___
Q. <u>Equipment and Signal Grounds.</u> (Para 3-23)			
Are equipment and signal grounds installed in accordance with applicable codes and standards and in accordance with installation drawings?	___	___	___

Figure 6-2. Sample of Final Installation Inspection Checklist (sheet 10 of 11).

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	<u>YES</u>	<u>NO</u>	<u>N/A</u>
R. <u>Conduits.</u> (Para 3-24)			
1. Are burrs removed from conduit after cutting?	___	___	___
2. Is bending radii in accordance with table 3-14, page 3-152?	___	___	___
3. Are there no more than four 90-degree bends in a single conduit run?	___	___	___
4. Does number of conductors in conduit conform to table 2-3, page 2-9?	___	___	___
5. Are conduits supported at intervals not exceeding 6 feet?	___	___	___
6. Have all fittings been tightened after installation?	___	___	___
S. <u>Ducts.</u> (Para 3-25)			
1. Are hangers for overhead ducts mounted first?	___	___	___
2. Is proper type mallet used in assembly?	___	___	___
3. Are flange sections cleaned before installation?	___	___	___
T. <u>Installation Drawings.</u> (Para 3-2)			
Have drawings been reviewed to assure "as built" accuracy?	___	___	___

Figure 6-2. Sample of Final Installation Inspection Checklist (sheet 11 of 11).

6.2.1.3 Revisions. The checklist may be revised to satisfy the QC inspection requirements for a specific function whenever it becomes necessary as a result of abnormal situations. A revision is considered to be any change to an inspection requirement or procedure through additions, deletions, or modifications. Revisions to this checklist may be authorized by the onsite QAR and QCR. All revisions will be documented and forwarded as specified in 6.1.2.

6.2.1.4 Exceptions and discrepancies. The QAR and QCR will identify and document all exceptions and deficiencies and will ensure that corrective action is taken for any discrepancies. Discrepancies not within the capability or responsibility of USACEEIA to resolve will be reported, to include recommended corrective action and identification of the responsible agency. Sections 6 and 7 are written to be used at all locations and links in the project.

6.2.2 Special QA inspection procedures.

6.2.2.1 The inspections described in the figures are interruptible at any point if disrupted by a hardware malfunction. They also may be interrupted at a compatible breaking point by the QAR and QCR to permit scheduled duty breaks. Any inspection that is interrupted because of a hardware malfunction shall be restarted at a point agreed upon by the QAR, QCR, and the installation team leader.

6.2.2.2 The QA inspections and procedures in the QA checklist have been sequenced in controlled manner; however, unforeseen problems may require an inspection or procedure to be resequenced. Resequencing of any inspection or procedure shall be agreed upon by the QAI and the installation team leader.

6.2.2.3 Spare equipment may be substituted for malfunctioning equipment upon agreement between the QCR and the installation team leader.

6.2.2.4 Once QC inspections have been completed on any C-E equipment, including cables and conduit, no changes or adjustments shall be performed without the approval of the QAR, pending performance of the operational acceptance test.

6.2.3 Acceptance testing.

6.2.3.1 The installation agency will power the equipment and conduct a burn-in period no less than 48 hours. Defective

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modules and components of the completed communications subsystem will be replaced during this period, and the QAR shall be notified of any exchange.

6.2.3.2 Upon satisfactory completion of the installation, USACEEIA Test and Evaluation Directorate, will perform operational tests to verify conformance with specified operational requirements. Cognizant agencies, departments, and commands having any requirements to interface with AUTOVON or other networks shall have made provisions for sufficient circuits and have them adequately conditioned before start of the final QC inspection. The operational tests shall be conducted in accordance with test procedures contained in section 7. Test results shall be fully documented.

6.2.4 Acceptance or rejection.

6.2.4.1 Recommendations for acceptance or rejection of the expanded facilities will be based upon a detailed analysis of all data obtained from the detailed inspection and the operational acceptance test.

6.2.4.2 Based upon the results of the detailed analysis, the QAI may direct all, or portions of any, inspections and tests be repeated to verify compliance with stated requirements and objectives.

6.2.4.3 The QCR and QAR may also recommend acceptance with exceptions. These exceptions will be documented and made only under conditions which permit use of the system, pending permanent resolution, using procedural methods to alleviate known problems.

6.3 QUALITY ASSURANCE DOCUMENTATION.

6.3.1 When figure 6-1 is completed according to 6.2.1.2a, it will become part of the site's permanent records.

6.3.2 Figure 6-2 shall be used for verification of inspection by the QAR, the installation team leader, and the local command or facility QC coordinator or representatives. Signatures on the QA checklist only recommend acceptance; they do not signify acceptance of the items under inspection.

6.3.3 Section 7 is for verification of satisfactory operational capability. All applicable data sheets are to be completed and will become part of the site's permanent records.



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6.3.4 Section 8 contains the material acceptance record forms that will be used to itemize the major components; to list exceptions, deficiencies, and remarks (along with responsible agency's remarks); and for acceptance and transferring of equipment.

#### 6.4 QUALITY ASSURANCE PLANS AND REPORTS.

6.4.1 Quality assurance plans. A formal QA plan is not required for this project. The provisions of this section cover all QA plans and procedures necessary to ensure the facility meets its stated requirements.

6.4.2 Status reports. The QAR will issue status reports necessary during the conduct of the inspections. Upon completion of all inspections and any necessary reinspections, the QAI shall prepare and issue a final QA inspection report and furnish copies to all cognizant organizations.

6.4.3 Corrections or modifications of documentation. The corrected copies of site plans, specifications, and drawings which were marked up during step 2 of the QA inspection process (6.2.1.2b) shall be forwarded to Commander, USACEEIA, ATTN: CCC-CED-XE, Fort Huachuca, Arizona 85613.

6.4.4 Final report. A final summary report of the QA and test efforts will be provided by the QAR/QCR and forwarded to the appropriate agencies. The report will be in the format specified by CCCR 702-2, will note any remaining installation and operational exceptions, and will recommend corrective actions as well as documenting project completion. The following items will be inclosed:

6.4.4.1 QA checklist prepared in accordance with this section.

6.4.4.2 Test results in accordance with section 7.

6.4.4.3 Technical acceptance records of section 8.

6.4.4.4 Other supporting data as appropriate.

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## SECTION 7. TEST AND ACCEPTANCE

7.1 SCOPE. This test plan specifies the necessary performance for acceptance testing of the TSEC/CY-104A.

7.2 TIME FRAME. The operational test and acceptance of the system shall be performed as specified in figure 7-1. US Army activities will begin testing after the installer has provided a written statement of readiness (unless otherwise specified in the contract or work order) to the US Army Communications-Electronics Engineering Installation Agency, ATTN: CCC-TED, Fort Huachuca, Arizona 85613, no less than 10 days before offering the system for Government acceptance. Other DOD activities will provide appropriate instructions.

7.3 TEST CRITERIA. Test procedures and requirements are as specified in figure 7-1. If one or more tests fail to meet requirements, an engineering or installation rework shall be performed on the section or sections that caused the substandard test results. The test director should determine which portions, if any, of the previous test were affected and those portions to be retested. Sheets 4-6 through 7-27 of figure 7-1 are preoperational tests.

7.4 TEST EQUIPMENT. Test equipment, or equivalent substitute, and each test procedure required for conducting the tests on the TSEC/CY-104A equipment is specified in appendix A. This SEIP does not include the test procedures for the AN/FCC-97, AN/FRC-162, or their associated equipment.

7.5 TEST PLAN ORGANIZATION. The acceptance test effort will be normally conducted by quality assurance representatives. The TSEC/HY-12A, TSEC/HN-74, and TSEC/KG-34 (TSEC/CY-104A equipment) is to be tested.

7.6 TEST RESULTS. A detailed log of all testing and test results shall be maintained. US Army activities shall provide USACEEIA, ATTN: CCC-TED, Fort Huachuca, Arizona 85613, a copy of the log and test results within 30 days after completion of testing. Other DOD activities should provide appropriate test results as directed by their headquarters.

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## A. SIGNAL VS. QUANTIZATION DISTORTION (TSEC/CY-104A).

1. PURPOSE. The quantization distortion test measures the maximum end-to-end noise inherent in the terminal encoding process.

2. REQUIREMENT. The quantizing noise from each voice frequency (VF) channel will be at a level of less than -31 decibels referred to 1 milliwatt (dBm), utilizing a 0 dBm0 test tone level at 1004 Hertz (Hz).

## 3. TEST EQUIPMENT REQUIRED.

<u>Nomenclature</u>	<u>Quantity</u>
Transmission Impairment Measuring Set (TIMS)	1
Multimeter, AN/USM-224 rms (VTVM)	1
Transmission and Noise Measuring Set, HP-3556A	1
Recorder, RO-458(V)I/U	1

4. TEST PROCEDURE. The test will be conducted multiplexer (mux) to mux over the link, using the following procedures:

a. Position all switches down on the TSEC/CY-104A equipment and ensure that all alarm lamps on module 7070 are out. Position all channel "make busy" switches up. Disconnect all test equipment including patch cords and plugs from the terminal.

b. Terminate all TSEC/CY-104A channels with 600 ohms, +1 percent, except the transmit channel, in order to read Levels on the test channel of the order of -40 dBm.

c. Set the test panel selector switch to DIST. Connect the vacuum tube voltmeter (VTVM) to the ACVM jack and connect the test tone generator to the model 7060 test panel (a part of the TSEC/CY-104A terminal) RCV lineup jack.

d. Place the PAD A and PAD B attenuator switches in the OUT position. Set the generator frequency for 1004 Hz.

Figure 7-1. Operational Test Procedures and Data Sheets (sheet 1 of 27).

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e. Set the 7060 test panel to DIST. Patch the RCV lineup jack of the test channel unit to the RCV lineup of 7060. Connect the noise measuring set to ACVM jack of the 7060 and set the BRDG/TERM 600-ohm switch to match the meter type. DO NOT CONNECT ANYTHING ELSE TO THE TEST PANEL. The test tone generator is tuned to 1004 Hz through the notch filter in the 7060 test panel. The 7060 at the receive terminal is set up to suppress the 1004 Hz test tone and pass the quantize noise throughout the VF band to the noise measuring set.

f. Connect the test tone generator to the 7060 OSC IN jack. Place the selector in the SET OSC position and adjust the tone generator output for 0 dBm0 with the VTVM. DO NOT CHANGE THE FREQUENCY SETTING. Set the test panel selector switch to DIST. Patch the 7060 XMT lineup jack to the test channel unit XMT line jack.

g. Measure the noise measuring set meter reading and record on the data sheet.

h. Repeat the procedures of steps f and g in turn for the remaining TSEC/CY-104A channels.

i. The test director will select one channel for recording.

j. Set up and calibrate the strip chart record and record for 72 hours.

k. Decalibrate the strip chart and normal equipment.

Figure 7-1. Operational Test Procedures and Data Sheets (sheet 2 of 27).

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## QUANTIZATION NOISE TEST SETUP

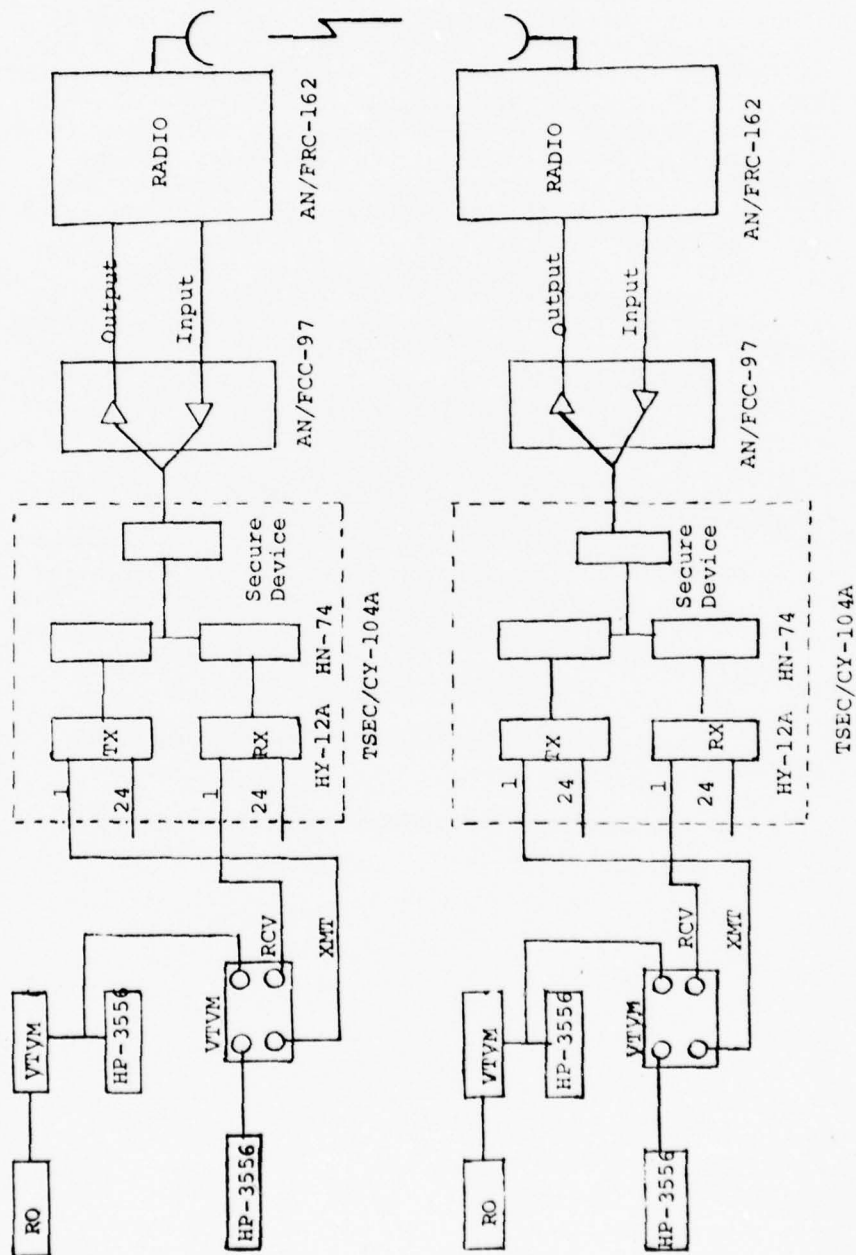


Figure 7-1. Operational Test Procedures and Data Sheets (sheet 3 of 27).



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TEST DATA SHEET

SIGNAL VS. QUANTIFICATION DISTORTION

Station: \_\_\_\_\_

Distant station: \_\_\_\_\_

Test results

<u>Channel</u>	<u>Port</u>	<u>Level</u>	<u>Channel</u>	<u>Port</u>	<u>Level</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Channel recorded: \_\_\_\_\_ Port: \_\_\_\_\_

Medium level: \_\_\_\_\_

Comments:

Test director: \_\_\_\_\_ Date: \_\_\_\_\_

Witness: \_\_\_\_\_ Date: \_\_\_\_\_

Figure 7-1. Operational Test Procedures and  
Data Sheets (sheet 4 of 27).

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B. AUDIO CHANNEL LEVEL.

1. PURPOSE. The audio channel level test measures the input and output of the TSEC/CY-104A. The test tone will be adjusted for proper level.

2. REQUIREMENTS.

a. The audio channel level of each VF channel will remain at 0 dBm  $\pm$ .25 dB from a 1004 Hz test tone level of 0 dBm0.

b. The test will be conducted at the equal level patch board.

c. The noise measuring equipment should be powered from its internal batteries to isolate it from local power company grounds.

3. TEST EQUIPMENT REQUIRED.

<u>Nomenclature</u>	<u>Quantity</u>
TMS	1
Multimeter, ME-303A/U (HP-410C)	1

4. TEST PROCEDURE. Test set up the equipment as indicated below:

a. Connect a patch cable between the BIPOLAR OUTPUT and the BIPOLAR INPUT jacks of the TSEC/CY-104A interface unit patch field.

b. Connect the oscillator to the channel 1 receive at the equal level patch board. Adjust the oscillator frequency to 1004 Hz and set the VTVM at 0 dBm0.

c. Connect the ac voltmeter to the channel 1 transmit at the equal level patch board.

d. Measure the test tone level (terminated into 600 ohms). Adjust the gain for 0 dBm0 at the channel module.

e. Repeat the above procedure for remaining channels 2 through 24.

Figure 7-1. Operational Test Procedures and  
Data Sheets (sheet 5 of 27).

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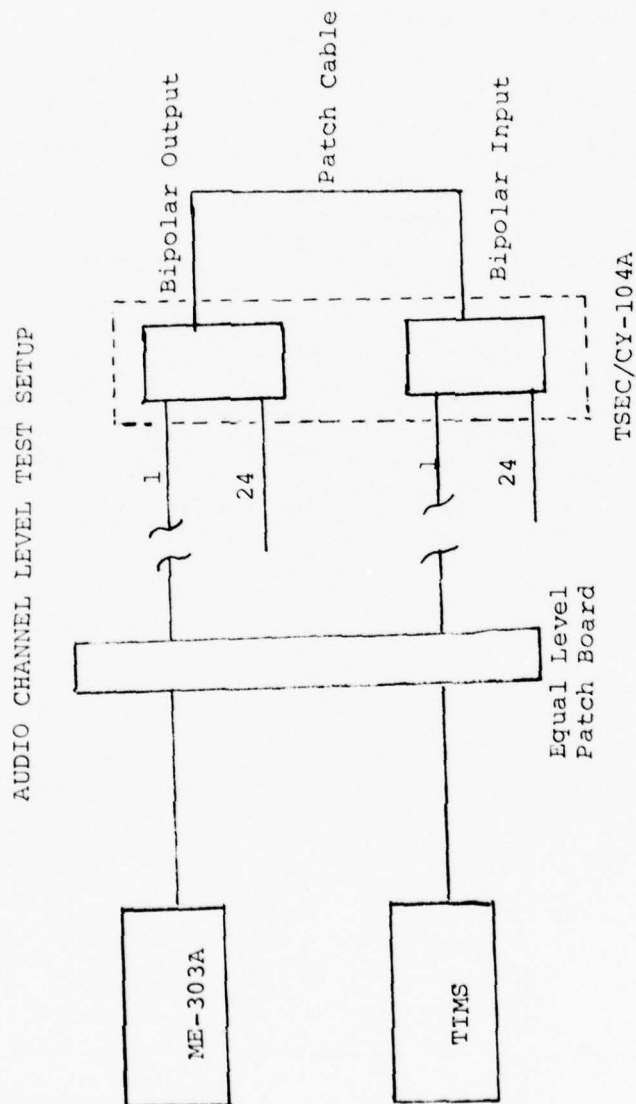


Figure 7-1. Operational Test Procedures and Data Sheets (sheet 6 of 27).

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TEST DATA SHEET

AUDIO CHANNEL LEVEL (LOOPBACK)

TSEC/CY-104A Rack \_\_\_\_\_

<u>Channel</u>	<u>Audio Ch Level</u>	<u>Channel</u>	<u>Audio Ch Level</u>
1	_____	13	_____
2	_____	14	_____
3	_____	15	_____
4	_____	16	_____
5	_____	17	_____
6	_____	18	_____
7	_____	19	_____
8	_____	20	_____
9	_____	21	_____
10	_____	22	_____
11	_____	23	_____
12	_____	24	_____

Comments:

Test director: \_\_\_\_\_ Date: \_\_\_\_\_

Witness: \_\_\_\_\_ Date: \_\_\_\_\_

Figure 7-1. Operational Test Procedures and  
Data Sheets (sheet 7 of 27).

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C. INSERTION LOSS VS. FREQUENCY.

1. PURPOSE. Insertion loss vs. frequency test measures the amplitude distortion as a function of frequency.

2. REQUIREMENTS.

a. At a constant test tone level of 0 dBm0, the following limits will apply:

- (1) 200 - 300 Hz:  $-.1$  to  $+3.00$  dB.
- (2) 300 - 400 Hz:  $-.7$  to  $+3.0$  dB.
- (3) 400 - 600 Hz:  $-.7$  to  $+1.5$  dB.
- (4) 600 - 2400 Hz:  $-.7$  to  $+1.7$  dB.
- (5) 2400 - 3000 Hz:  $-.7$  to  $+1.5$  dB.
- (6) 3000 - 3400 Hz:  $-.1$  to  $+3.0$  dB.

b. The test will be performed at the equal level patch board.

c. NOTE: For tests conducted in the presence of other signals (such as traffic in other frequency bands and pilots) the level meter must be a frequency selective meter. When such a meter is used, the input signal should be interrupted after each returning to ensure the meter is tuned to the correct signal.

d. The equipment under test must be correctly terminated, either by the equipment to which it is normally connected, by an external resistor, or by the built-in termination in the meter. (In the first two cases the level meter must be in the high impedance or bridging condition.)

Figure 7-1. Operational Test Procedures and  
Data Sheets (sheet 8 of 27).



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3. TEST EQUIPMENT REQUIRED.

<u>Nomenclature</u>	<u>Quantity</u>
TIMS	1
Transmission and Noise Measuring Set, HP-3556A	1
Frequency Measuring Set, CP-772A/U	1
600-ohm Load	As required

4. TEST PROCEDURE. Test setup the equipment as indicated below:

a. Access will be from the technical control equal level patch board. Loop back the CY-104A under test. This loop back will include all TSEC/CY-104A equipment.

b. Set the output impedance of the oscillator to match the 600-ohm circuit impedance; set the output frequency and level as required. Unless otherwise specified, the test level will be 0 dBm.

c. Adjust the range setting of the level meter to give a convenient scale reading. Set the meter to FILTER-15kHz LPF, INPUT TO FLAT-TERM and RESPONSE TO 500 milliseconds (msec).

d. For each frequency setting of the oscillator, check the input level and adjust if necessary to maintain it at the test tone level. Record the output level on the test data sheet.

e. Repeat the test for each channel.

Figure 7-1. Operational Test Procedures and  
Data Sheets (sheet 9 of 27).

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INSERTION LOSS VS. FREQUENCY TEST SETUP

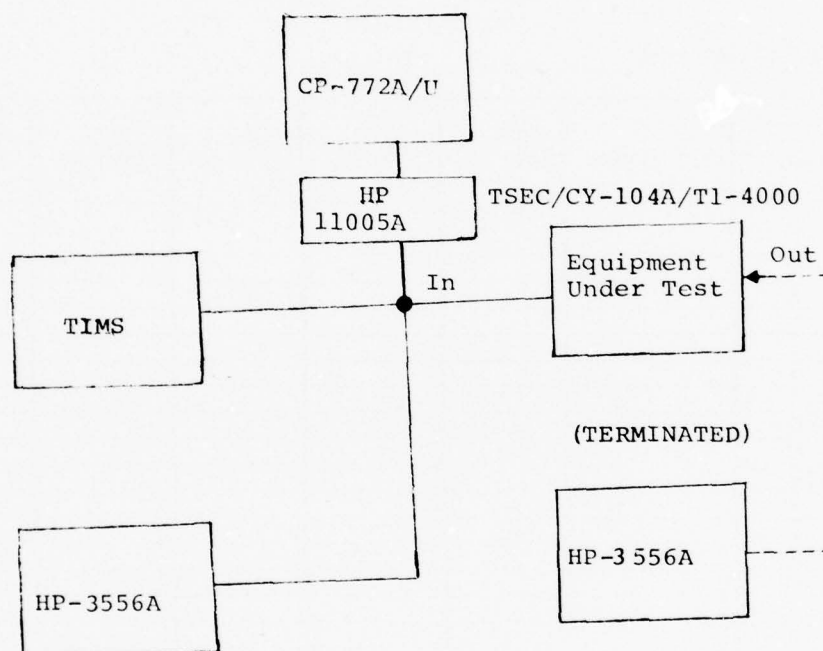


Figure 7-1. Operational Test Procedures and  
Data Sheets (sheet 10 of 27).

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## TEST DATA SHEET

INSERTION LOSS VS. FREQUENCY

TSEC/CY-104A Rack

Channel	*TLP (dBm)	300- 400 Hz	400- 600 Hz	600- 2400 Hz	2400- 3000 Hz	3000- 3400 Hz
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						

\*Transmission level point (TLP) is the raw level in dBm of a 1020 Hz test tone.

Test director: \_\_\_\_\_ Date: \_\_\_\_\_

Witness: \_\_\_\_\_ Date: \_\_\_\_\_

Figure 7-1. Operational Test Procedures and Data Sheets (sheet 11 of 27).

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D. IDLE CHANNEL NOISE.

1. PURPOSE. The idle channel noise test measures the enhancement of equipment noise.

2. REQUIREMENTS.

a. The idle channel noise is measured with 3 kHz flat weighting.

b. Noise shall be less than -67 dBm0.

c. Tests will be conducted at the equal level patch board with the multiplex in a loopback condition.

3. TEST EQUIPMENT REQUIRED.

<u>Nomenclature</u>	<u>Quantity</u>
Termination Plug, 600-ohm, $\pm 1$ percent	As required
Transmission and Noise Measuring Set, HP-3556A	1

4. TEST PROCEDURE. Connect the equipment as indicated below:

a. Preliminary setup.

(1) Disconnect all test equipment including patch cords, plugs, and leads from both the transmit and receive CY-104A.

(2) At the transmit end, terminate all channel units in 600 ohms.

(3) Set the noise measuring set for 3 kHz flat weighting.

(4) Connect a patch cable between the BIPOLAR OUTPUT and the BIPOLAR INPUT jacks of the TSEC/CY-104A interface unit patch field.

b. Testing.

(1) Connect the input of the noise measuring set to the receive end of the channel under test.

(2) From the meter, read and average value from the oscillating pointer.

(3) Repeat for all 24 channels.

Figure 7-1. Operational Test Procedures and Data Sheets (sheet 12 of 27).

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## IDLE CHANNEL NOISE TEST SETUP

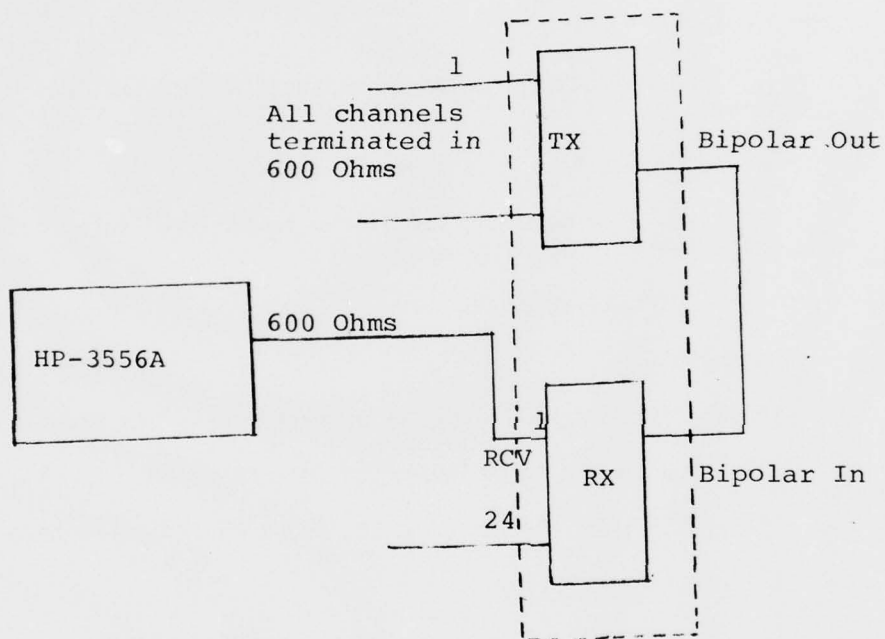


Figure 7-1. Operational Test Procedures and Data Sheets (sheet 13 of 27).

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TEST DATA SHEET  
AUDIO CHANNEL LEVEL (LOOPBACK)

TSEC/CY-104A Rack \_\_\_\_\_

<u>Channel</u>	<u>Idle Channel Noise (dBm)</u>	<u>Channel</u>	<u>Idle Channel Noise (dBm)</u>
1	_____	13	_____
2	_____	14	_____
3	_____	15	_____
4	_____	16	_____
5	_____	17	_____
6	_____	18	_____
7	_____	19	_____
8	_____	20	_____
9	_____	21	_____
10	_____	22	_____
11	_____	23	_____
12	_____	24	_____

Comments:

Test director: \_\_\_\_\_ Date: \_\_\_\_\_

Witness: \_\_\_\_\_ Date: \_\_\_\_\_

Figure 7-1. Operational Test Procedures and  
Data Sheets (sheet 14 of 27).



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## E. ADJACENT CHANNEL CROSSTALK.

1. PURPOSE. The adjacent channel crosstalk test measures the level of VF crosstalk present in a channel.

## 2. REQUIREMENTS.

a. This test will be conducted as shown in the test setup on page 7-18.

b. The following sampling sequence will be used:  
channels 12, 13, 1, 17, 5, 21, 9, 15, 3, 19, 7, 23, 11, 14,  
2, 18, 6, 10, 16, 4, 20, 8, and 24.

c. The crosstalk level will be less than -65 dBm0 with a 1004 Hz tone.

d. Power the test equipment from their batteries to isolate the equipment.

## 3. TEST EQUIPMENT REQUIRED.

<u>Nomenclature</u>	<u>Quantity</u>
TIMS	1
Multimeter, AN/USM-224/rms VTVM	1
Transmission and Noise Measuring Set, HP-3556A	1
600-ohm Load	As required

## 4. TEST PROCEDURE. Connect the equipment as indicated below:

a. Preliminary setup.

(1) Disconnect all test equipment including patch cords, (leads from the transmit and receive terminals).

(2) Connect a patch cable between the BIPOLAR OUTPUT and the BIPOLAR INPUT jacks of the TSEC/CY-104A interface unit patch field.

Figure 7-1. Operational Test Procedures and Data Sheets (sheet 15 of 27).

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b. Testing.

(1) Connect the TIMS input (600-ohm) to the channel 13 receive jack of the equal level patch board.

(2) Connect the test tone generator to the channel 12 transmit jack of the equal level patch board and adjust the output level for 0 dBm0 at 1004 Hz. This becomes the "disturbing channel." Record the average level on the test sheet.

(3) Repeat the procedure for the sequence as given in the test data sheet and paragraph 2b.

Figure 7-1. Operational Test Procedures and Data Sheets (sheet 16 of 27).

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## ADJACENT CHANNEL CROSSTALK TEST SETUP

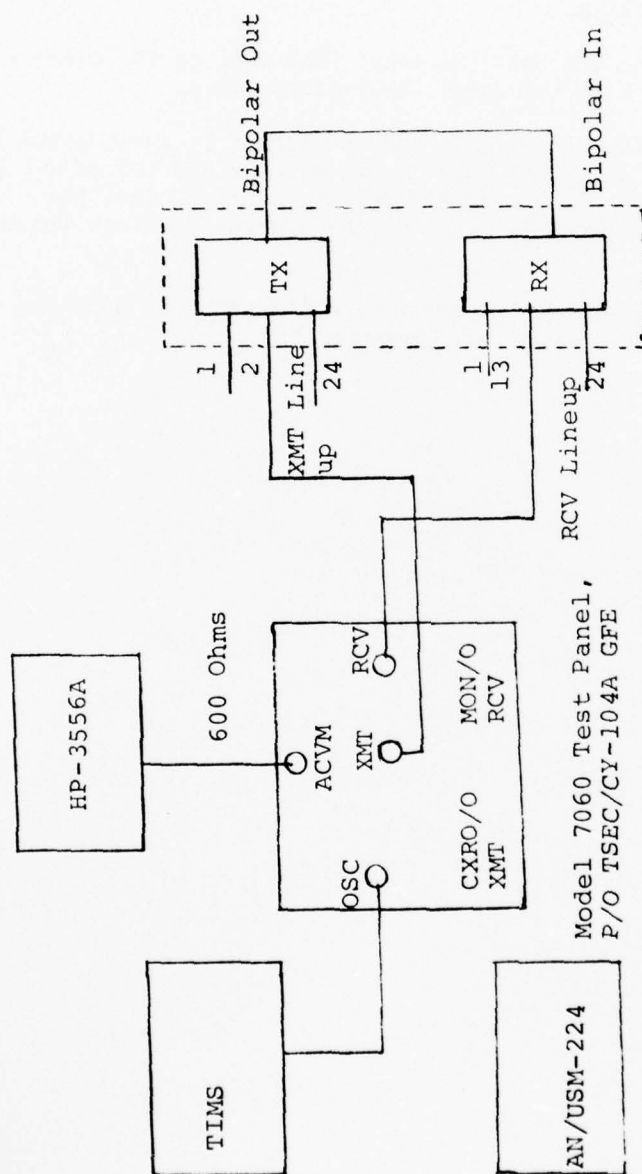


Figure 7-1. Operational Test Procedures and Data Sheets (sheet 17 of 27).

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TEST DATA SHEET

ADJACENT CHANNEL CROSSTALK

CY-104A Rack _____	Site Loopback _____	
	Link ( ) _____	
<u>CH (TX - RX)</u>	<u>Crosstalk, dBm</u>	<u>Design objectives test limits, less than</u>
12-13		-65 dBm0
13-1		"
1-17		"
17-5		"
5-12		"
21-9		"
9-15		"
15-3		"
3-19		"
19-7		"
7-23		"
23-11		"
11-14		"
14-2		"
2-18		"
18-6		"
6-22		"
22-10		"
10-16		"
16-4		"
4-20		"
20-8		"
8-24		"

Test director: \_\_\_\_\_ Date: \_\_\_\_\_

Witness: \_\_\_\_\_ Date: \_\_\_\_\_

Figure 7-1. Operational Test Procedures and Data Sheets (sheet 18 of 27).

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## F. ENVELOPE DELAY DISTORTION.

1. PURPOSE. The envelope delay distortion test measures the frequency response of the system as a function of signal envelope.

## 2. REQUIREMENTS.

a. This test evaluates the envelope delay distortion characteristics of individual voice frequency channels by using the delay measuring set for manual sweep across the 4 kHz channel. Four sweep methods are possible: end-to-end without reference, end-to-end with return reference, end-to-end with forward reference, and in-station equipment tests.

b. End-to-end with return reference eliminates the necessity of synchronizing the modulating signal oscillators. Modulation is detected from the received amplitude-modulated swept carrier at the receiving station and applied to an unswept fixed frequency carrier for return to the originating transmitting station where its phase is measured relative to the phase of the modulating signal. This method measures envelope delay in the TRANSMIT direction and is particularly useful where measurements are made and recorded primarily at the transmitting station. However, a separate reference return voice channel is required.

c. It is recommended that the envelope delay distortion be measured in at least three voice channels per group, preferably channels 2, 6, and 11.

d. The envelope delay distortion requirements shall be less than 600 USEC in the band of 600 Hz to 3200 Hz and shall be less than 200 USEC in the band of 1000 Hz to 2600 Hz.

## 3. TEST EQUIPMENT REQUIRED.

<u>Nomenclature</u>	<u>Quantity</u>
Envelope Delay Measuring Set, TS-2669A/GCM	1

4. TEST PROCEDURE. Note that the arrangement to be used when measuring between sites requires that a return circuit be available from receiver to transmitter.

Figure 7-1. Operational Test Procedures and Data Sheets (sheet 19 of 27).

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- a. Set the input and output impedance of the test set to 600 ohms; using a test frequency of 1004 Hz, adjust the level to a value of -10 dBm0.
- b. Set the test set mode to "RET REF" and set the modulation frequency to the value required (normally 83-1/3 Hz).
- c. Set the switches on both sets to END-TO-END and the modulation frequency to the value required (normally 83-1/3 Hz).
- d. Set the carrier frequency to the desired test frequency and read the delay, using the appropriate scale. Repeat, changing the carrier frequency incrementally to cover the test band, (600 Hz to 3200 Hz).
- e. The delay reference frequency will be 1004 Hz. All delays shall be computed relative to this reference frequency.

Figure 7-1. Operational Test Procedures and Data Sheets (sheet 20 of 27).



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## ENVELOPE DELAY DISTORTION TEST CONNECTION

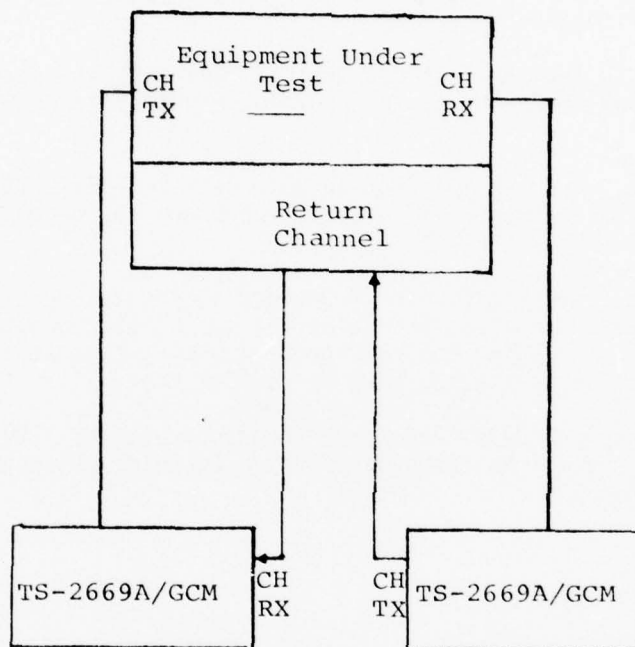


Figure 7-1. Operational Test Procedures and Data Sheets (sheet 21 of 27).

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TEST DATA SHEET  
ENVELOPE DELAY DISTORTION

TSEC/CY-104A Rack \_\_\_\_\_

<u>Channel</u>	<u>600 Hz to 3200 Hz</u>	<u>1000 Hz to 2600 Hz</u>
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
7	_____	_____
8	_____	_____
9	_____	_____
10	_____	_____
11	_____	_____
12	_____	_____
13	_____	_____
14	_____	_____
15	_____	_____
16	_____	_____
17	_____	_____
18	_____	_____
19	_____	_____
20	_____	_____
21	_____	_____
22	_____	_____
23	_____	_____
24	_____	_____

Test director: \_\_\_\_\_ Date: \_\_\_\_\_

Witness: \_\_\_\_\_ Date: \_\_\_\_\_

Figure 7-1. Operational Test Procedures and  
Data Sheets (sheet 22 of 27).

## G. ALARM OPERATION REQUIREMENTS (TSEC/CY-104A).

1. PURPOSE. The alarm operation test verifies that CY-104A alarm indicators are functioning properly.

2. REQUIREMENTS. This test assures that the system is properly operating when all alarm indicators are off.

3. TEST EQUIPMENT REQUIRED. None.

## 4. TEST PROCEDURE.

a. Connect the TSEC/CY-104A equipment in a back-to-back configuration.

b. Check that the MAN/AUTO switch on the HN-74 alarm unit is in the AUTO position.

c. Unplug the HN-74 terminal matching unit. This should cause a LOCAL alarm in the HY-12A (indicated by the HY-12A LOC and FRAME lamps lighting).

d. Push the RESET button on the HN-74 power supply.

e. Plug in the HN-74 terminal matching unit. Push the KG-34 XMTR PREP button. This should cause system synchronization.

f. This concludes alarm requirements unless otherwise directed.

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TEST DATA SHEET

ALARM OPERATION

<u>EQUIPMENT</u>	<u>PASS</u>	<u>FAIL</u>	<u>REMARKS</u>
------------------	-------------	-------------	----------------

1. Loop back test results:

---

Figure 7-1. Operational Test Procedures and Data Sheets (sheet 24 of 27).

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H. BIT ERROR RATE (TSEC/CY-104A).

1. PURPOSE. The TSEC/CY-104A will meet operational bit error rate (BER), if so equipped, of  $1 \times 10^{-7}$  or greater for a period of 2 hours. This will provide a 95 percent confidence level.
2. SPECIFIC REQUIREMENTS. Back-to-back or over the link  $1 \times 10^{-7}$  BER or greater. If seven errors or more appear during the test period, repeat the test.

3. TEST EQUIPMENT REQUIRED.

<u>Nomenclature</u>	<u>Quantity</u>
Analyzer Data Error	2

4. TEST PROCEDURES.

- a. Back-to-back testing.
- b. Apply a loopback to the TSEC/CY-104A under test.
- c. Apply the input and output of the data card under test to the test set.
- d. Test and record the BER on the data sheet.
- e. Remove the back-to-back setup and perform the BER rate test over the link. Repeat steps c and d.

Figure 7-1. Operational Test Procedures and Data Sheets (sheet 26 of 27).

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BER TEST SETUP

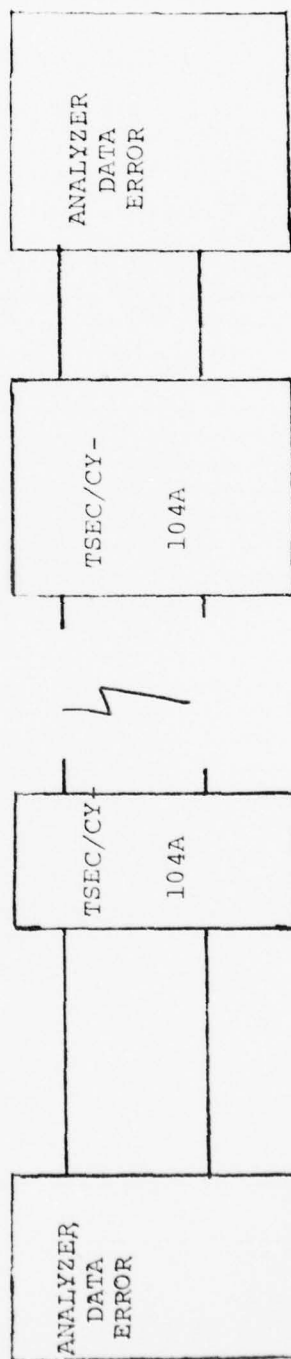
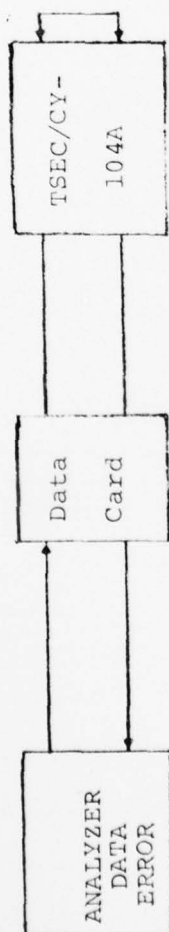


Figure 7-1. Operational Test Procedures and Data Sheets (sheet 25 of 27).



AD-A061 653

ARMY COMMUNICATIONS COMMAND FORT HUACHUCA ARIZ  
STANDARD ENGINEERING INSTALLATION PACKAGE MULTICHANNEL CIPHERY --ETC(U)  
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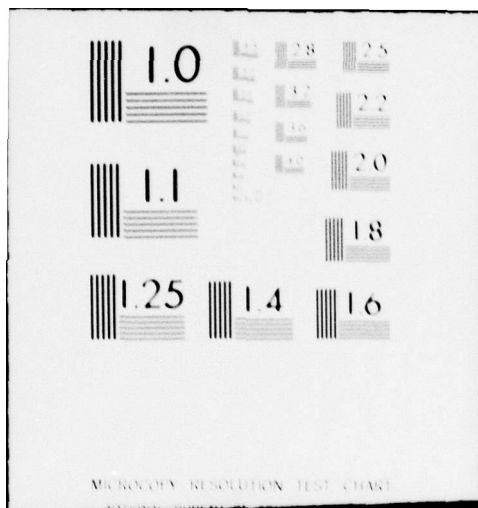
2 OF 2

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A061 653



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TEST DATA SHEET

BIT ERROR RATE

TSEC/CY-104A Loopback \_\_\_\_\_ Over the Link \_\_\_\_\_

Channel	Port	Data Rate	BER (Requirement $1 \times 10^{-7}$ )
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			

Remarks:

Test director: \_\_\_\_\_ Date: \_\_\_\_\_

Witness: \_\_\_\_\_ Date: \_\_\_\_\_

Figure 7-1. Operational Test Procedures and Data Sheets (sheet 27 of 27).

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## SECTION 8. COMPLETION CERTIFICATION

8.1 GENERAL. The completed document shall consist of the information indicated by the sample technical acceptance record (TAR) (fig. 8-1). The information and documentation provided by these sheets may be expanded to meet the requirements of the specific project.

8.2 DISTRIBUTION. The distribution list for the TAR will be provided in the tasking document, QA test plan, or contractual document.

8.3 RECORD. Prescribed TAR items are as follows: (Record may be locally reproduced.)

8.3.1 Paragraph 1 (Project). Identify project.

8.3.2 Paragraph 2 (Facility). Identify facility.

8.3.3 Paragraph 3 (Location). Identify geographic location.

8.3.4 Paragraph 4 (Operating Agency). Identify organization.

8.3.5 Paragraph 5 (Engineering Agency). Identify organization.

8.3.6 Paragraph 6 (Installation Agency). Identify organization.

8.3.7 Paragraph 7 (Quality Assurance/Test Agency). Identify organization.

8.3.8 Paragraph 8 (Project Description). Provide brief description of the project purpose.

8.3.9 Paragraph 9 (Equipment Provided). This paragraph lists two parts: paragraph 9A, operational equipment installed, and paragraph 9B, test equipment successfully tested and calibrated. All hardware listed is correlated to the project BOM item number, and quantities shown are for items successfully tested/calibrated only.

8.3.10 Paragraph 10 (Documentation Provided). This paragraph lists two parts: paragraph 10A, drawings provided to operator, and paragraph 10B, technical manuals provided to the operator. Drawings are listed in numerical sequence, with the title and sheet quantity identified for each. Technical manuals are listed by equipment BOM item in numerical sequence, with the equipment described and the manual quantity identified for each item.

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8.3.11 Paragraph 11 (Exceptions). Exceptions to project completion and to full facility operation are identified in detail. Each exception will be identified separately and categorized according to the agency or 11A, B, C, or D anticipated to be responsible for corrective action. This categorization constitutes the test director's recommendation and is not binding. The project manager retains tasking authority regarding resolution of all exceptions.

8.3.12 Paragraph 12 (Remarks). Comment by the QA/test, installation, and operating agencies or respective paragraphs 12A, B, or C is encouraged. In the event a representative of the engineering agency is at hand during execution of final documentation, comment from that source is also encouraged. Remarks should be confined to technical matters affecting the project. Laudatory comment relative to support received, or work accomplished, although commendable, should be addressed in separate correspondence. Standard statements to be entered on all TAR's by the QA/test agency are shown in this paragraph as well as reference to other documentation, if required.

8.3.13 Paragraph 13 (Certification). Signatures are affixed by installation, operating, and QA/test agency representatives to authenticate activity which transpired during the acceptance test phase and to verify that system status is as stated in the document. The certifications contained in or prescribed by this publication are essential to the conduct of the Government's business.

8.3.14 Paragraph 14 (Acceptance). The O&M commander, or his representative, indicates by his signature that the system described in the document is accepted for full operation, less exceptions noted, if any.

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TECHNICAL ACCEPTANCE RECORD

1. Project: \_\_\_\_\_
2. Facility: \_\_\_\_\_
3. Location: \_\_\_\_\_
4. Operating Agency: \_\_\_\_\_
5. Engineering Agency: \_\_\_\_\_
6. Installation Agency: \_\_\_\_\_
7. Quality Assurance/Test Agency: \_\_\_\_\_
8. Project Description: \_\_\_\_\_

Figure 8-1. Sample Technical Acceptance Record (sheet 1 of 14).



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9. Equipment Provided:		A. Operational Equipment:	
BOM Item No.	Description	Part Number	Qty On Rqr Site

Figure 8-1. Sample Technical Acceptance Record (sheet 2 of 14).

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9. Equipment Provided:		B. Test Equipment:	
BOM Item No.	Description	Part Number	Qty On Rqr Site

Figure 8-1. Sample Technical Acceptance Record (sheet 3 of 14).

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10. Documentation Provided:		A. Drawings:
Drawing Number	Title	Sheet

Figure 8-1. Sample Technical Acceptance Record (sheet 4 of 14).

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10. Documentation Provided:		B. Technical Manuals:	
BOM Item No.	Description	Part Number	Technical Manual  On Rqr Site

Figure 8-1. Sample Technical Acceptance Record (sheet 5 of 14).

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11. A. Exceptions for which the operating agency assumes  
responsibility:

Figure 8-1. Sample Technical Acceptance Record (sheet 6 of 14).

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11. B. Exceptions for which the installation agency assumes  
responsibility:

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Figure 8-1. Sample Technical Acceptance Record (sheet 7 of 14).



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11. C. Exceptions requiring resolution by the engineering agency:

Figure 8-1. Sample Technical Acceptance Record (sheet 8 of 14).

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11. D. Exceptions requiring resolution by the project manager:

Figure 8-1. Sample Technical Acceptance Record (sheet 9 of 14).

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## 12. Remarks:

## A. QA/Test Agency:

(1) This document signifies that the equipment identified in paragraph 9 is technically acceptable for operation. This document does not signify acceptance of the equipment by the O&M command, nor does it serve to transfer accountability for property book purposes; both of these are actions which must be consummated by the project manager (PM)/O&M commander.

(2) Paragraph 11 contains agreements by personnel involved in acceptance testing relative to agency responsibility for correction of exceptions identified. Assignments will be adjusted and confirmed by the PM subsequent to distribution of this document.

(3) Disposition of excess project material is a USACSA function.

(4) One copy of each marked-up drawing listed at paragraph 10A is provided to the operating command with execution of this document.

(5) All technical manuals listed at paragraph 10B are provided to the operating command with execution of this document.

(6) One copy of each test data sheet, prepared during the installation shakedown test and during acceptance test, is provided to the operating command with execution of this document.

Figure 8-1. Sample Technical Acceptance Record (sheet 10 of 14).

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12. Remarks:

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B. Installation agency:

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Figure 8-1. Sample Technical Acceptance Record (sheet 11 of 14).

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12. Remarks:

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C. Operating agency:

---

Figure 8-1. Sample Technical Acceptance Record (sheet 12 of 14).

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13. Certification: Acceptance test and quality assurance inspections are complete for this project.

Without exception\_\_\_\_. With exception cited para 11\_\_\_\_.

INSTALLATION AGENCY REPRESENTATIVE

Printed: \_\_\_\_\_  
Signed: \_\_\_\_\_  
Title: \_\_\_\_\_  
Organization: \_\_\_\_\_  
Date: \_\_\_\_\_

OPERATING AGENCY REPRESENTATIVE

Printed: \_\_\_\_\_  
Signed: \_\_\_\_\_  
Title: \_\_\_\_\_  
Organization: \_\_\_\_\_  
Date: \_\_\_\_\_

QA/TEST AGENCY REPRESENTATIVE

Printed: \_\_\_\_\_  
Signed: \_\_\_\_\_  
Title: \_\_\_\_\_  
Organization: \_\_\_\_\_  
Date: \_\_\_\_\_

Figure 8-1. Sample Technical Acceptance Record (sheet 13 of 14).



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14. Acceptance: This project is accepted for full operation:

Without exception\_\_\_\_. With exception cited para 11\_\_\_\_.

OPERATING COMMAND

Printed: \_\_\_\_\_

Signed: \_\_\_\_\_

Title: \_\_\_\_\_

Organization: \_\_\_\_\_

Date: \_\_\_\_\_

Figure 8-1. Sample Technical Acceptance Record (sheet 14 of 14).

DEPARTMENT OF THE ARMY  
US Army Communications Electronics  
Engineering Installation Agency  
Fort Huachuca, Arizona 85613

POSTAGE AND FEES PAID  
DEPARTMENT OF THE ARMY  
DoD 314



OFFICIAL BUSINESS  
PENALTY FOR PRIVATE USE \$300

COMMANDER  
US ARMY COMMUNICATIONS-ELECTRONICS  
ENGINEERING INSTALLATION AGENCY  
ATTN: CCC-CED-SEP  
Fort Huachuca, Arizona 85613

DEPARTMENT OF THE ARMY  
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COMMANDER  
US ARMY COMMUNICATIONS-ELECTRONICS  
ENGINEERING INSTALLATION AGENCY  
ATTN: CCC-CED-SEP  
Fort Huachuca, Arizona 85613

This standard engineering installation package is based on the most current thinking at US Army Communications Command. Your experience and help can improve our responsiveness in this area. Please send us your comments. Thanks.

Comments on SEIP \_\_\_\_ (please give number)

SEIP MGT Officer  
AUTOVON 879-6719

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How can we contact you?

Rank	Name	Duty position	Duty station	AUTOVON number
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SEIP MGT Officer  
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How can we contact you?

Rank	Name	Duty position	Duty station	AUTOVON number
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1 August 1978

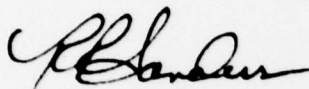
SEIP 031

(CC-OPS)

FOR THE COMMANDER:

OFFICIAL:

EUGENE J. VITETTA  
Colonel, GS  
Chief of Staff



R. R. SANDERS  
Major, AGC  
Assistant Adjutant General

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