

SYSTEM PRACTICE 00194

EK-616

Description and Installation Manual

Issue 1-1 May 1, 1984

This manual should be read in its entirety before attempting to install or program the system.

This manual has been developed by TIE/communications, Inc. It is intended for the use of its customers and service personnel.

Any comments or suggestions for improving this manual would be appreciated. Forward your remarks to:

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Attention: Manager, Technical Publications

The information in this manual is subject to change. While every effort has been made to eliminate errors, the company disclaims liability for difficulties arising from interpretation of the information contained herein.

REVISION CONTROL

REVISION	DATE	CHANGE
0-1	08 APR 83	First Draft.
0-2	19 APR 83	Second Draft. Engineering changes to all sections.
0-3	13 JUN 83	Third Draft. Engineering changes to all sections.
0-4	12 AUG 83	Engineering changes, never printed.
0-5	16 AUG 83	Engineering changes, never printed.
0-6	19 AUG 83	Corrected manual to match a working production unit.
0-7	23 AUG 83	Included minor revisions throughout, never printed.
0-8	24 AUG 83	Included new engineering input.
0-9	22 SEP 83	Included new engineering input, never printed.
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0-11	14 OCT 83	Included new engineering input.
1-0	30 MAR 84	<p>Section 1: Specifications Table (Table 1-1) revised. Drawing of Standard Key Telephone enhanced. Added FCC regulation for non-hearing aid-compatible telephones.</p> <p>Section 2: Key callouts revised per engineering input. Feature descriptions enhanced, and all tables alphabetized. Table 2-3 added.</p> <p>Section 3: Permitted Code OCW added. All tables moved to the end of the section. System and Station OCWs modified for consistency with Section 4. Table 3-1 was reformatted, and text was modified accordingly. Ordering information expanded.</p> <p>Section 4: Program keys included with program description and each coinciding table.</p> <p>Section 5: Engineering input was incorporated into the section. Additional information regarding radio frequency interference was revised at the end of the section.</p> <p>Section 6: Programming description revised.</p> <p>Section 7: Section 7 written for this manual. All information regarding Theory of Operation for the EK-616 Electronic Key Telephone System has been added.</p> <p>Section 8: Section 8 written for this manual. All information regarding maintenance of the EK-616 Electronic Key Telephone System was added.</p> <p>Section 9: Reformatted. Each optional device appears on a separate sheet.</p>

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REVISION CONTROL

REVISION	DATE	CHANGE
1-1	1 MAY 84	<p>Section 1: Figures 1-2 and 1-3 have been corrected and both shown on the same angle.</p> <p>Section 2: Key callouts have been corrected.</p> <p>Section 3: Information on Toll Restriction has been revised.</p> <p>Section 4: Program references (to Section 3) have been added to all programming prompts.</p> <p>Section 5: New information on Radio Frequency Susceptibility has been added.</p> <p>Section 9: New information regarding Wall Mounting Telephones, Speakerphone, Door Chime Box, External Music Connections, Alarm Connections and External Page Zone Connections has been added.</p>

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ELECTRONIC KEY TELEPHONE SYSTEM

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EK-616

ELECTRONIC KEY TELEPHONE SYSTEM

SECTION 1, GENERAL DESCRIPTION

1. INTRODUCTION

1.01 The GENERAL DESCRIPTION Section provides basic information pertaining to the EK-616 Electronic Key Telephone System (EKTS). It describes the various components of the system, available telephones, system specifications, site requirements and Federal Communications Commission/telephone company requirements.

1.02 Figure 1-2 and 1-3 have been revised per engineering.

2. SYSTEM DESCRIPTION

2.01 The EK-616 EKTS uses a Z80 microprocessor with Erasable Programmable Read Only Memory (EPROM) and Complementary Metal Oxide Semiconductor (CMOS) Random Access Memory (RAM) for the main operating program. The system is designed for small businesses that require two to six Central Office (CO) lines. The EK-616 system has a maximum capacity of 16 stations, six CO lines and six intercom links.

KEY SERVICE / POWER SUPPLY UNIT

2.02 The EK-616 Key Service Unit (KSU) and Power Supply (Figure 1-1) are contained in one unit designed for wall mounting. The KSU portion of the unit houses replaceable Printed Circuit Boards (PCBs). The power supply portion supplies DC voltage to the system.

TELEPHONES

2.03 The system can use the EK-616 Standard Key Telephone and Executive Display Key Telephone. All telephones transmit various visual and audible signals that enable the user to distinguish among outside, inside and paging calls.

Standard Key Telephones

2.04 The Standard Key Telephone (Figure 1-2) has six CO line keys and eight Direct Station Selection (DSS) keys which also provide Automatic Dialer functions. These telephones also have keys that access other feature functions.

Executive Display Key Telephones

2.05 The Executive Display Key Telephone (Figure 1-3) provides all the features of the Standard Key Telephone, as well as several unique features including full speakerphone operation and a display indicating time, date and the dialed number. The Executive Display Key Telephone is available in two configurations to accommodate tone signaling or pulse signaling during power failure. This telephone has six CO line keys and 16 DSS keys which also provide Busy Lamp Field (BLF) indications and Automatic Dialer functions. An Executive Display Key Telephone is also required to program the system.

3. SPECIFICATIONS

3.01 Refer to Table 1-1 for technical specifications.

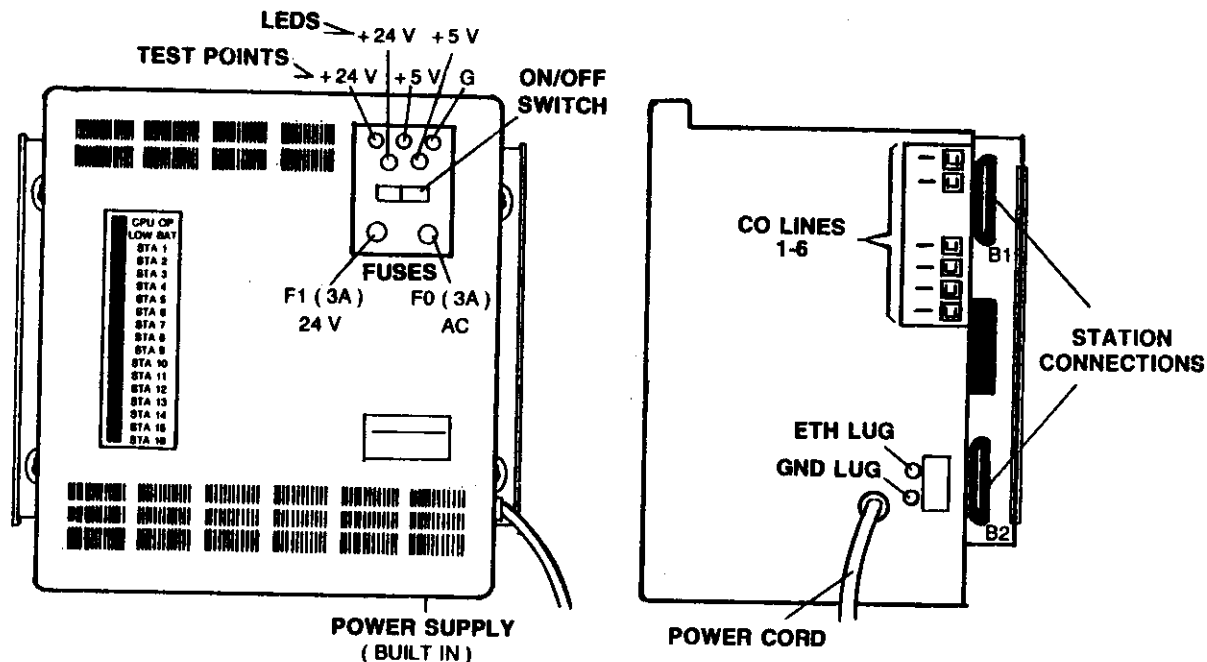


Figure 1-1 KEY SERVICE UNIT / POWER SUPPLY, EK-616

4. SITE REQUIREMENTS

4.01 The EK-616 KSU / Power Supply Unit should be installed in a clean, dry, secure location that prevents access by unauthorized personnel. This location should comply with Bell Functional Product Class Criteria of September, 1978, in publication PUB 48002, as stated in 3.4.3.2. paragraph C--Indoors W / Environmental Control. The room must have adequate ventilation and have a temperature range 0°-45° C (32°-113° F) with 10% -95% non-condensing relative humidity.

4.02 The customer must provide a dedicated three wire 117 V AC, 60 Hz circuit. The KSU / Power Supply Unit draws a maximum of 1.5 amps. The power circuit must be protected with the appropriate circuit breaker or fuse. A separate earth ground is required in addition to the third wire ground.

5. FCC AND TELCO REQUIREMENTS

5.01 Rules and regulations for the operation and installation of telephone equipment have been established by the Federal Communications Commission (FCC). According to Part 68 (Connection of Terminal Equipment to the Telephone Network) and its amendments, several actions are required before and during installation of customer-provided telephone equipment. These actions are detailed in the following paragraphs.

HEARING AID COMPATIBILITY

5.02 FCC rules prohibit the use of non-hearing-aid-compatible telephones in the following locations:

- (1) Any public or semipublic location where coin-operated or credit card telephones may be found.
- (2) Elevators, highways, and tunnels (automobile, subway, railroad, or pedestrian) where a person with impaired hearing might be isolated in an emergency.
- (3) Places where telephones are specifically installed to alert emergency authorities such as fire, police, or medical assistance personnel.
- (4) Hospital rooms, residential health care facilities, convalescent homes, and prisons, specifically where telephones are used for signaling life-threatening or emergency situations if alternative signaling methods are not available.
- (5) Workstations for hearing impaired personnel.
- (6) Hotel, motel, apartment lobbies; in stores where patrons use telephones to order merchandise; in public transportation terminals where telephones are used to call taxis, or to reserve lodging or rental automobiles.
- (7) Hotel and motel rooms. At least ten per cent of the rooms must contain telephones that are compatible with hearing aids; or contain jacks for plug-in telephones that are compatible with hearing aids, which will be provided upon request to hearing impaired customers.



Figure 1-2 KEY TELEPHONE, STANDARD, EK-616



Figure 1-3 KEY TELEPHONE, EXECUTIVE DISPLAY, EK-616

NOTIFICATION TO TELCO

5.03 The owner of the system must supply the following information prior to connecting or disconnecting the system:

1. Sufficient notice of the intention of using privately-owned equipment.
2. The particular lines to be used (telephone numbers xxx-xxxx through xxx-xxxx).
3. Model: **EK-616**
FCC Registration Number: **C9C719-12298-KN-E**
Ringer Equivalence: **0.6B**
4. Type of Connection: **RJ11C (USOC)**

CERTIFICATION OF INSTALLER

5.04 This system must be connected to telephone company lines with FCC approved plugs and jacks. A technician must be certified to install an EK-616 EKTS. Installation classes for certification are available through TIE/communications, Inc., and its regional offices.

INCIDENCE OF HARM

5.05 When trouble is experienced, the customer shall disconnect the registered equipment from the telephone line to determine if the registered equipment is malfunctioning. If the registered equipment is malfunctioning, the use of such equipment shall be discontinued until the problem has been corrected.

5.06 When practical, the telephone company must notify the customer that service may be temporarily discontinued if customer-provided equipment is causing harm to the telephone network. The telephone company must attempt to inform the customer that service is to be discontinued prior to actually terminating service. The telephone company must also provide customers with an opportunity to correct the problem and must advise customers of their right to bring complaint procedures before the FCC.



Table1-1 SPECIFICATIONS, EK-616 SYSTEM

System Capacity:		Maximum Number
CO lines		6
Intercom Talkpaths		6
Stations (including Executive stations)		16
Cable Requirements: Two pair twisted station wire. Maximum cable run up to 1500 feet (453m). 1000 feet (305m) using 24 AWG or 1500 feet (453m) using 22 AWG wire.		
Power Requirements:		
KSU / Power Supply Operating Range: 117 V AC \pm 10%, 60 Hz \pm 1 Hz		
Power Dissipation:		
KSU / Power Supply Unit -- 100 Watts; 375 BTU/hr.		
Dimensions and Weights:		
KSU / Power Supply Unit:	14.2" H x 11.6" W x 10.8" D 36.0cm x 29.5cm x 27.4cm	11.0 lbs. 5.0 Kg.
Key Telephone:	2.8" H x 8.0" W x 8.6" D 7.1cm x 20.3cm x 21.8cm	2.1 lbs. 0.7 Kg.
Executive Telephone:	3.2" H x 8.0" W x 8.6" D 8.1cm x 20.3cm x 21.8cm	2.2 lbs. 1.0 Kg.
Monitor Box Station:	1.6" H x 4.4" W x 5.4" D 4.1cm x 11.2cm x 16.3cm	0.5 lbs. 0.2 Kg.
Door Box Station:	1.6" H x 4.4" W x 5.4" D 4.1cm x 11.2cm x 16.3cm	0.5 lbs. 0.2 Kg.
Environmental Operating Conditions:		
Temperature: KSU and Telephones - 0° to 45° C (32° to 113° F) Door Box - - 20° to 70° C (- 4° to 158° F)		
Humidity: 10% - 95%		
BGM Specifications:		
Input Impedance: 600 OHM Input Level: Nominal 80 millivolts (- 20 dBm) Maximum Input: 1 Volt RMS		
MOH Specifications:		
Input Impedance: 600 OHM Input Level: Nominal 400 millivolts (- 6 dBm) Maximum Level: 1 Volt RMS		
Ratings of Door-Unlock Contacts:		
30 V AC, 75 WATTS		
Alarm Circuit:		
1K OHM @ 5 V DC 10K OHM @ 24 V DC Maximum input: 24 V DC		
External Paging Specifications:		
Output Impedance: 600 OHM Output Level: Nominal 250 millivolts (- 10 dBm)		

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ELECTRONIC KEY TELEPHONE SYSTEM

SECTION 2, FEATURES

1. INTRODUCTION

1.01 The FEATURES Section defines the features and describes the station equipment of the EK-616 Electronic Key Telephone System (EKTS). The appropriate user's guides provide instructions for the use of each telephone.

1.02 Key callouts have been revised. Feature descriptions enhanced per engineering input.

2. STATION EQUIPMENT

2.01 The following equipment is used with the EK-616 EKTS: the EK-616 Standard Key Telephone, the EK-616 Executive Display Key Telephone, Monitor Box and the Door Chime Box. The Monitor and Door Chime Box are described in Section 9, OPTIONAL EQUIPMENT.

STANDARD KEY TELEPHONES

2.02 The EK-616 Standard Key Telephone (Figure 2-1) contains a built-in microphone and speaker to allow handsfree reply on Intercom (ICM) calls. In addition to the dial pad, the telephones have keys that access CO lines, special function keys, and eight Direct Station Selection (DSS) keys which also provide the Automatic Dialer. Most keys are equipped with a Light Emitting Diode (LED) to indicate the status of the call or feature. Visual and audible signals provide various tone and flash patterns that distinguish outside, ICM and paging calls (Table 2-1 and 2-2). The volume level for audible signals and voice announcements can be adjusted with the slide volume control on the face plate of the telephone.

EXECUTIVE DISPLAY KEY TELEPHONES

2.03 The EK-616 Executive Display Key Telephone (Figure 2-2) provides all the features of the Standard Key Telephones and several unique features including power failure operation and a display indicating call and feature status. There are 16 DSS keys which also provide Busy Lamp Field (BLF) indications and Automatic Dialer Functions. The Executive Display Key Telephone is used to program the system.

2.04 A cross reference of feature keys is provided in Table 2-3.

3. FEATURES

3.01 The following paragraphs define the features in an EK-616 system.

TYPES OF FEATURES

3.02 Each feature is one of three types: permanent, programmable or optional. Permanent features are intrinsic to the system hardware and cannot be altered by system programming. Programmable features are entered or changed when programming the system. Optional features require the installation of optional equipment.

ALARM

3.03 Stations may be programmed to receive audible alarm signals from a customer provided source through the telephone speaker.

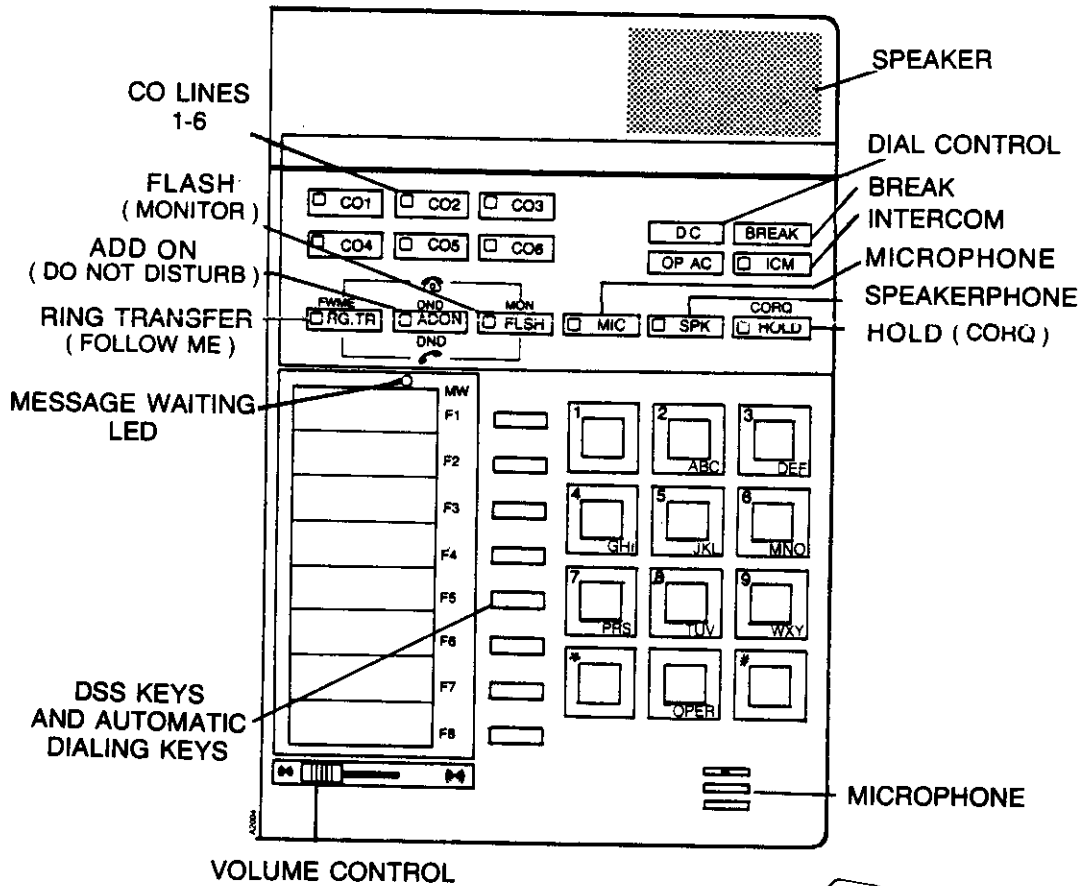


Figure 2-1 KEY TELEPHONE, EK-616, KEY DESIGNATIONS

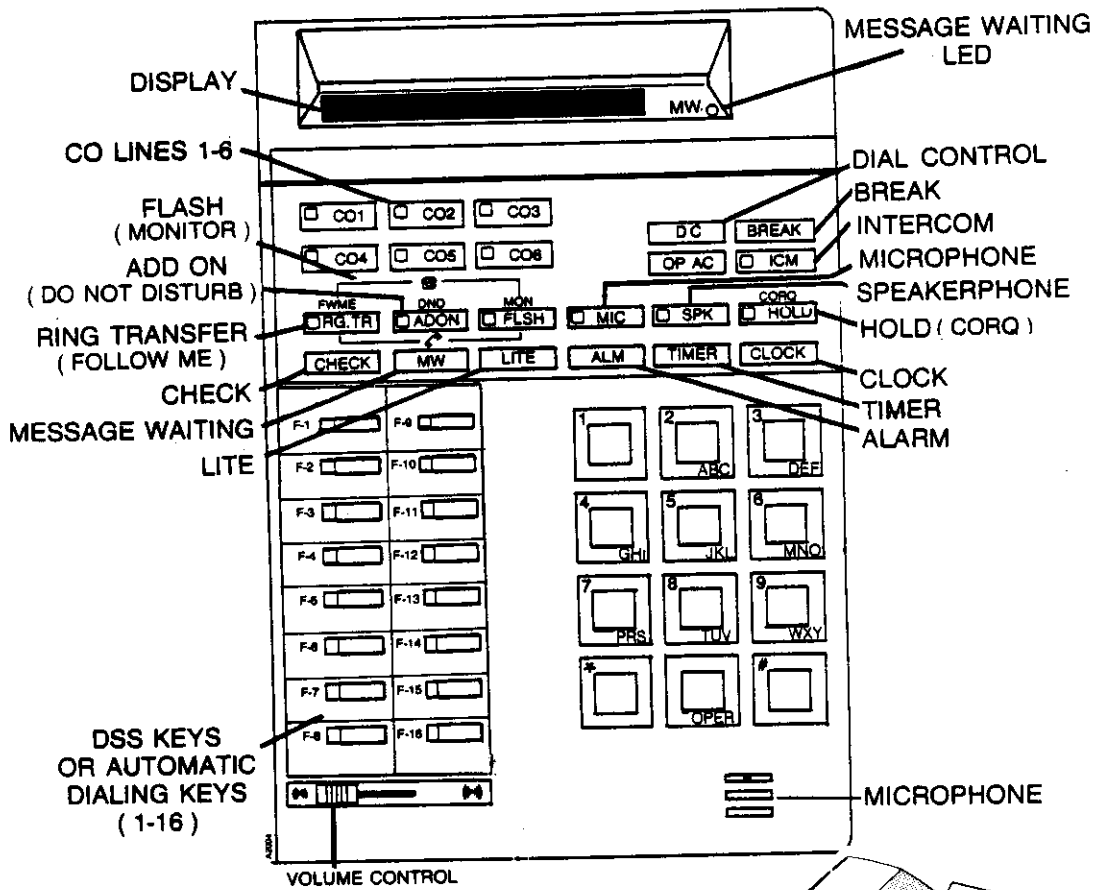


Figure 2-2 EXECUTIVE DISPLAY KEY TELEPHONE, EK-616, KEY DESIGNATIONS

ALARM CLOCK FEATURE

3.04 The Executive Display Key Telephone has three Alarm Clock settings: Alarms 1, 2 and 3. Alarms 1 and 2 are non-repeating alarms. Alarm 3 repeats and sounds each day at the same time. The alarm tone will sound for approximately four minutes unless terminated.

ALTERNATE POINT ANSWER

3.05 Alternate Point Answer allows Intercom calls to be answered at any station in the same internal zone. If two Intercom calls are made simultaneously, the call to the station with the lowest station number has priority.

AUTOMATIC DIALER

3.06 Automatic Dialer is a programmable feature that permits automatic dialing of stored telephone numbers. Each station stores the numbers by using the DSS keys as bin storage location. Each bin accommodates one number that contains up to 20 digits. Automatic Dialer numbers can be chained, i.e. more than one Automatic Dialer number may be included in a dialing sequence. This allows Automatic Dialing numbers to be used with special services such as MCI, SPRINT, etc. Each Standard Key Telephone can store a maximum of 8 numbers; an Executive Display Key Telephone can store up to 16 numbers. Special dialing functions may be included in Automatic Dialer numbers.

BACKGROUND MUSIC

3.07 Background Music (BGM) can be broadcast through the telephone speaker. This music is automatically turned off when the telephone is in use. Background Music requires a separate music source that the customer must provide.

BARGE-IN

3.08 Barge-In is a programmable feature that enables designated stations to intrude upon conversations. There are two types of Barge-In: CO Line Barge-In and Intercom Barge-In. A tone will be heard at a station before another station barges-in. ICM calls in the Handsfree reply mode can be intruded upon only by a tone signal given to the calling party.

Stations are programmed into one of four levels for Barge-In:

Level 0

(a) Stations without Barge-In.

Level 1

- (a) Station users can directly intrude upon a CO line call, causing a three-way conversation.
- (b) Intercom calls in the handset to handset mode can also be directly intruded upon.

Level 2

(a) Intercom calls in the handset to handset mode can be directly intruded upon.

Level 3

(a) Station users can only intrude upon handset to handset ICM calls with a tone signal.

NOTE: The Barge-In feature will disable the Off Hook Tone Signaling feature when a station with Barge-In levels 1 - 3 calls an off hook station assigned Off Hook Tone Signaling.

CALL MONITOR

3.09 Call Monitor permits a user to dial a number without lifting the handset. It also allows the user, while on Hold from an outside party, to monitor the call with the handset on hook. The user can hear through the telephone speaker when the outside party returns to the call, and, unless the station has speakerphone capabilities, must lift the handset to be heard by the outside party. If a call is monitored from a station equipped with the Speakerphone feature, the microphone should be turned off.

CALLBACK

3.10 After placing an Intercom call to a busy station, a user can request to be called back when the station becomes free. Answering the Callback ring within 20 seconds will automatically dial the number of the station that was previously busy. The Callback ring stops if the initiating party does not answer before the called party becomes busy again. However, the Callback request is not cancelled and will ring the initiating party when the called party becomes free.

CAMP-ON

3.11 When an Intercom call is placed to a busy station, the Camp-On feature is used to connect the caller with the called station. When the called station becomes free it will receive an ICM signal. To use the Camp-On feature the calling station must remain off hook.

CENTRAL OFFICE CALL, INCOMING

3.12 Incoming calls can be answered at any telephone that is programmed to receive calls on a specific line. Telephones display a distinctive flash rate on the associated line key (Table 2-1). Incoming Central Office (CO) calls also provide a distinctive tone signal at the station (Table 2-2).



CENTRAL OFFICE CALL, OUTGOING

3.13 Outgoing calls can be initiated from any station that is programmed to place calls on designated CO lines. The dialing mode can be changed from rotary (pulse) to tone to accommodate special services that require tone signals.

CO AUDIBLE DISABLE, STATION

3.14 Each station can be programmed to disable (block) audible signals for incoming CO calls. This feature functions only while the system is in the normal day signaling mode. Other features which involve the transfer or forwarding of incoming audible signals may affect the use of this feature.

CONFERENCE CALL

3.15 Two types of conferencing are available: External and Internal. External Conference enables a maximum of two internal stations to be connected to an outside line and up to two outside lines can be included in a conference. Up to two External Conferences can occur simultaneously. The MLCU-6TA PCB is required for External Conference. Internal Conference permits up to five stations to be connected in one intercom conversation.

DIAL PULSE TO DTMF CONVERSION

3.16 Dial Pulse to DTMF conversion allows a system that requires dial pulse signaling to use services that need DTMF signaling.

DIRECT STATION SELECTION

3.17 Key telephones have Direct Station Selection (DSS) keys that provide single key Intercom access to particular stations. Each key corresponds to a particular station. The Standard Key Telephones have eight DSS / Automatic Dialer keys. The DSS key assignments for Standard Key Telephones are determined by the user. The Executive Display Key Telephones have 16 DSS / Automatic Dialer keys. Each key is equipped with an LED which indicates the status of the assigned station. DSS key assignments for the Executive Display Telephone are pre-assigned.

DISPLAYS

3.18 The following paragraphs explain the display features unique to the Executive Display Key Telephones.

Automatic Dialer Display

3.19 Automatic Dialer numbers can be reviewed.

Brightness Control

3.20 The brightness of the display can be controlled. There are three levels of brightness that can be changed from brighter to dimmer.

Call Timer Display

3.21 The duration of a call can be timed and displayed.

Intercom Display

3.22 The display will show the station number of the source of an ICM call. The station number will not be shown if the display is in the stopwatch mode.

Message Waiting Display

3.23 Pressing the flickering MW key displays the number of the station that placed a Message Waiting indication.

Number Dialed Display

3.24 The number dialed (up to 11 digits) is displayed. When more than 11 digits are dialed, only the last 11 digits dialed are displayed.

Speed Dial Display

3.25 Speed Dial Display is a feature that displays the number stored in Speed Dial.

Stopwatch Display

3.26 The Executive Display Key Telephones will serve as a stopwatch and indicate the time in seconds.

Time / Date Display

3.27 The time and date are normally shown on the display.

DO NOT DISTURB

3.28 Do Not Disturb (DND) is a programmable feature that blocks all incoming and Intercom audible signals to a station. Callers attempting to reach a station in the DND mode receive a fast busy tone.

DOOR CHIME BOX

3.29 The Door Chime Box is an optional Intercom unit equipped with a microphone and speaker to enable Handsfree Reply. When activated, the box sends a chime to an assigned station. The station then places an Intercom call to the Door Chime Box to establish communication. The Door Chime Box can also be used to provide the Door Unlock Control feature. This enables a station user to unlock a door after communicating with the Door Chime Box user. When a system contains more than one Door Chime Box, the Door Unlock Control can only be used at the Door Chime Box assigned the lowest station number.

EXECUTIVE CALL FORWARD

3.30 The Executive Call Forward feature forwards all incoming CO and Intercom calls from one station in the Executive Call Forward pair to the other station in the pair. The executive station must be programmed for Do Not Disturb (DND). A maximum of 15 pairs of Executive Call Forward partners can be assigned. More than one executive may be assigned to the same partner.

FLASH

3.31 The Flash feature provides a new dial tone without losing the CO line. Pressing the FLSH (MON) key for less than two seconds will provide the two second flash required by telco for establishing a new dial tone. If the FLSH (MON) key is pressed for more than two seconds, the Flash will last as long as the key is pressed. When a line is programmed for Private Branch Exchange (PBX) operation, Flash provides a signal to the PBX requesting transfer dial tone. The duration of the Flash may be programmed from 100ms - 25 sec., determined by the requirements of the PBX. If the FLSH (MON) key is pressed for more than the programmed duration, the Flash will last longer than the programmed duration. The system is provided with an open loop flash. However, a ground flash may be provided, by mounting a Ground Flash (GRDU-6A) PCB on the MLCU-6TA PCB.

FLEXIBLE AUDIBLE

3.32 Each station can be programmed to receive CO audible signals for each line, and audible for all CO lines when the system is in the Night Service mode.

FLEXIBLE LINE ACCESS

3.33 Each station can be programmed for full access to each line. Each line may be programmed to permit limited access by stations not programmed for full access. Limited access allows answering incoming calls and retrieving calls on hold.

HOLD

3.34 Hold is a permanent feature for placing a call in a temporary waiting condition. There are two types of Hold: **I-Hold** and **Exclusive Hold**.

I-Hold

3.35 I-Hold is a common hold. A call placed on I-Hold can be retrieved at any station that has been programmed to access the line. The appropriate line LED flutters at the telephone where the call was placed on Hold (I-Hold). The line LED flashes at all other telephones (Table 2-1). After the programmed I-Hold Reminder time period, the system automatically resignals the station that placed the call on Hold. The duration of the signal is the programmed Recall / Reminder Signal time.

Exclusive Hold

3.36 Exclusive Hold places a call on Hold and prevents that call from being retrieved at any other station. The call can only be retrieved at the station where the call was originally placed on Hold. At that station, the appropriate line key flickers (Exclusive Hold); at other stations, the line key remains steadily illuminated. If the call is not retrieved within the Exclusive Hold Recall time period, the system signals the original station. If the call is still not retrieved after the programmed Recall / Reminder Signal time period, the call reverts to I-Hold and can be retrieved at any station that has been programmed to access the line.

INTERCOM CALL FORWARD WITH FOLLOW-ME

3.37 The Intercom Call Forward With Follow-Me feature allows a user to forward Intercom calls to another station (pages are not forwarded). The feature must be initiated at the user's own telephone. Intercom calls can be forwarded to other stations from the user's own telephone or from the station to which calls have been forwarded.

LAST NUMBER REDIAL

3.38 Last Number Redial is a permanent feature available to all stations that are not restricted from placing an outside call. This feature automatically stores the last number manually dialed from the station (while on an outside line) for automatic dialing at a later time. The number is stored until any other number is dialed, whether the call was answered, not answered or busy.

LINE QUEUING

3.39 Line Queuing is a programmable feature that enables a station to queue (wait in line) for an available CO line in a busy line group. Each station can queue any of the line groups, but can only queue a particular line group once. The system automatically signals the stations, in order, when a line in the line group is available. When a line in the group becomes available, the line LED flickers and the recall tone is given at the next station in the queue. If the line is not accessed within 20 seconds, the line is made available to the next station in the queue. A busy station will be bypassed. The line is offered when the station becomes idle.

MEET-ME ANSWER PAGING

3.40 Meet-Me Answer Paging is a programmable feature that enables a user to transmit a page to locate a specific person and then establish a private handset-to-handset conversation. Initiating a page renders the paged zone and All Call unavailable for 30 seconds or until the conversation is established.

NOTE: Only stations in the paged zone may respond unless the All Call page is used.

MEET-ME CONFERENCE

3.41 Up to five stations in the same internal page zone can join in a Conference that is initiated by a page. When Meet-Me Conference is initiated All Call and the paged zone are unavailable for 30 seconds or until five stations are in conference. A splash tone is heard when parties are joined.

NOTE: Only stations in the paged zone may respond, unless the All Call Page is used.

MESSAGE WAITING

3.42 The Message Waiting feature provides an indication at a called station that does not answer. The indication is a fluttering MW LED at the called station and a flickering MW LED at the calling station.

MICROPHONE MUTE

3.43 The Microphone Mute feature allows the user to turn the microphone in the key telephone on or off. When the microphone is off, the Microphone Mute feature provides privacy at a muted station during a conversation by preventing the other party from hearing what is being said at that station. If the Microphone Mute mode is selected while the telephone is idle, the user must press the MIC key to respond to incoming voice announced ICM calls. Both parties receive a double splash tone indicating that the called station is in the Microphone Mute mode. Key telephones equipped with the Speakerphone can also turn the microphone off (mute the microphone) while on an outside call to monitor the call. The LED on the MIC key is illuminated when the microphone is turned off.

MUSIC-ON-HOLD

3.44 Music-On-Hold (MOH) provides music to outside lines when they are placed on Hold. MOH can use an external music source or the internal music source provided by the system.

NIGHT SERVICE

3.45 The Night Service feature permits designated stations to receive incoming CO audible signals and alarm signals. This feature is normally used at night. There are two types of Night Service: **Night Service, Preset** and **Night Service, Selectable**.

Night Service, Preset

3.46 Night Service, Preset is activated at Station 10. Telephones to receive night signaling are designated during system programming. When placed in the Night Service mode, designated stations receive all audible signals for all incoming calls and alarm signals.

Night Service, Selectable

3.47 Night Service, Selectable permits the Station 10 user to transfer CO ringing normally received by Station 10 to other stations in the system. This feature is activated from Station 10. This feature is intended for use in place of Night Service, Preset when it is not desirable to send CO audible for private lines to other stations at night.

NOTE: When Night Service, Selectable is activated, Night Service, Preset is also activated.

OFF HOOK TONE SIGNALING

3.48 Off Hook Tone Signaling is a programmable feature that provides visual and audible signals of an ICM and incoming CO call to a user who is off hook (Tables 2-1 and 2-2). This feature is automatic when programmed.

NOTE: An off hook station will not receive off hook signals when called from a station programmed for Barge-In levels 1 - 3.

PAGING

3.49 Paging is a system programmable feature. There are three types of paging: **All Call Page** to page the entire system, **Internal Zone Page** to page selected areas, and **External Zone Page** to page through optional external paging equipment.

All Call Page

3.50 An All Call Page is broadcast over all stations and external paging zones that are programmed to receive page announcements.

Internal Zone Page

3.51 Internal Zone Page provides paging to a select group of stations. Telephones are programmed into paging zones during installation. A maximum of three internal page zones can be programmed. Paging can be by individual zone or simultaneously on all three internal zones.

External Zone Page

3.52 Optional paging equipment can be added to the system to receive pages. This equipment is referred to as external zones. A maximum of two external zones can be programmed. External paging equipment can be assigned during programming to receive CO audible. The incoming CO line call can then be answered at any key telephone which receives that line.

PLACING INTERCOM CALLS

3.53 The Intercom (ICM) feature is used to call another station. The system is programmed for one of two signaling modes: Voice Announce, which allows handsfree reply over the Intercom voice switch circuit, or Intercom Ring, which requires handset (private) reply. When the system is programmed for Voice Announce, ringing will occur when the system capacity of voice switch circuits is reached. The talkback timer can be programmed to limit the time of an ICM call in the Handsfree Reply mode. When the call exceeds the programmed talkback time the voice switch circuit is released and the called station receives ICM tone ringing.

NOTE: Voice Announced calls to stations with Speakerphone capabilities will not be affected by the talkback timer.

POWER FAILURE TRANSFER

3.54 Power Failure (PF) Transfer is a permanent feature that enables stations to answer incoming calls during a power failure. During a service interruption, Standard Key Telephones can only receive calls and require the installation of a PF bell. Executive Display Key Telephones receive CO audible and allow a user to dial a call. Stations are assigned access to CO lines during a power failure as follows:

CO Line Number	Station Number with RMSU	Stations Numbers with RMXU-6A PCB
1	10	10 and 11
2	13	13 and 14
3	16	16 and 17
4		18 and 19
5		21 and 22
6		24 and 25

PRIVATE BRANCH EXCHANGE LINES

3.55 Each CO line may be assigned for operation behind a Private Branch Exchange (PBX). PBX access codes must be programmed into system memory to allow proper operation of toll restriction and Class of Service. The duration of the flash is programmable for PBX lines.

RELEASE OF ABANDONED CALL ON HOLD

3.56 Release of Abandoned Call on Hold returns a line to an idle condition if an outside party waiting on hold hangs up. This occurs if an open loop disconnect is given from the telco office. The system can be programmed to recognize a disconnect signal from 20 milliseconds to 2 seconds.

ROOM MONITOR

3.57 The Room Monitor feature enables a station user to monitor sounds in a room where a key telephone or Monitor Box is located. Both stations must be in the Monitor mode. The monitored station LED flutters. The monitoring station LED flickers (Table 2-1). Refer to Section 9, OPTIONAL EQUIPMENT for Monitor Box operation.

SAVE

3.58 The Save feature stores the last manually dialed outside number for automatic dialing at a later time. The number will be erased when a new number is saved.

SPEAKERPHONE

3.59 The Speakerphone allows full handsfree communication on ICM or CO line calls. The Speakerphone is standard with the Executive Display Key Telephones; the Standard Key Telephones require the installation of an optional PCB (see Section 9).

SPECIAL DIALING FUNCTIONS

3.60 Special Dialing Functions, including a programmable pause, flash, stop or change of dialing mode, may be included in an Automatic Dialer or Speed Dial number. Any Special Dial Function counts as a digit in the stored number.

SPECIAL LINE ACCESS

3.61 During system programming, selected lines may be assigned as Private Lines. These lines may be programmed to completely deny access by other stations. Limited line access may also be programmed to allow other stations to pick lines up (if on Hold) or answer them (if an incoming call).

SPEED DIAL

3.62 Speed Dial allows up to 60 telephone numbers, with up to 20 digits each to be stored in system memory, in addition to those stored in the Automatic Dialer. They are programmed into the system at station 10. The numbers are accessed by a two digit code and are available to every station that is not restricted by programming. Speed Dial numbers can be chained, i.e. more than one Speed Dial number can be included in a dialing sequence. This accommodates special services such as MCI, SPRINT, etc. In addition, Special Dialing Functions may be included in a Speed Dial number.

THREE-MINUTE WARNING TONE

3.63 The system can be programmed to automatically provide the calling station with a signal every three minutes during an outgoing call.

TOLL RESTRICTION

3.64 Toll Restriction is a system programmable feature that prohibits selected stations from placing unauthorized long distance (toll) calls. Stations can be restricted to internal and local calls, depending on the Class of Service for that station.

TRANSFER

3.65 Transfer is a permanent feature used to send an outside call from one station to another. Calls are transferred using either Voice Announcements or the Ring Inward mode. A call on a common CO line can be transferred using the dial Intercom or the DSS keys. The station from which the transfer originated will receive a reminder tone for the appropriate CO line if the called station does not answer after the programmed Ring Inward or I-Hold Reminder time, based on the Transfer mode used.



Table 2-1 VISUAL INDICATIONS ON KEY TELEPHONES, EK-616

FUNCTION	LED	INDICATION
CO LINE		
Busy	CO	Steady
Exclusive Hold (Initiating Stations)	CO	120 IPM Flicker
Exclusive Hold (All Other Stations)	CO	Steady
I-Hold (Initiating Stations)	CO	300 IPM Flutter
I-Hold (All Other Stations)	CO	120 IPM Wink
Incoming Call	CO	60 IPM Flash
INTERCOM		
Incoming Intercom Call	ICM	300 IPM Flutter
Intercom Line Busy	ICM	Steady
MISCELLANEOUS		
Do Not Disturb	ADON (DND)	Steady
Executive Call Forward	ADON (DND)	60 IPM
Intercom Call Forward with Follow-Me (Initiating Station)	RGTR (FWME)	120 IPM Flicker
Intercom Call Forward with Follow-Me (Receiving Station)	RGTR (FWME)	300 IPM Flutter
Line Queue Accepted	HOLD (CORQ)	120 IPM Flicker
Line Queue Requested	HOLD (CORQ)	Steady
Message Waiting called station	MW	300 IPM Flutter
Message Waiting calling station	MW	120 IPM Flicker
Microphone Off	MIC	Steady
Monitored Station	FLSH (MON)	300 IPM Flutter
Monitoring Station	FLSH (MON)	120 IPM Flicker
Night Service, Selectable	RGTR (FWME)	Steady
Speakerphone Enabled	SPK	Steady

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Table 2-2 AUDIBLE SIGNALS ON KEY TELEPHONES, EK-616

TYPE OF AUDIBLE	FREQUENCY AND DURATION
Alarm Clock	1170 Hz, 0.1Sec. ON / 0.1Sec. OFF
CO Line Automatic Recall and Queue	580 Hz AM, 0.5Sec. ON / 0.5Sec. OFF
CO Line Incoming Call	580 Hz AM, 1Sec. ON / 3Sec. OFF
Door Box Chime - 1	FAST CHIME, 0.25Sec. ON / 0.5Sec. OFF
Door Box Chime - 2	SLOW CHIME, 0.5Sec. ON / 1.0Sec. OFF
Emergency - Sensor in Operation	580 Hz, 0.1Sec. ON / 0.1Sec. OFF
Follow-Me Denied	440 Hz, 5 SPLASH
Intercom Call (Busy Tone)	440 Hz, 0.5Sec. ON / 0.5Sec. OFF
Intercom Call (Do Not Disturb Tone)	440 Hz, 0.1Sec. ON / 0.1Sec. OFF 0.1Sec. ON / 0.7Sec. OFF
Intercom Ring Tone	630 Hz / 530 / 16 Hz FM, 1.0Sec. ON / 1.0Sec. OFF
Intercom Voice-Announce Splash Tone	
With Handsfree Reply	440 Hz, 1 SPLASH
With ICM MIC MUTE	440 Hz, 2 SPLASH
Intrusion Tone	440 Hz, 2 SPLASH, 0.1Sec. ON / 0.1Sec. OFF / 0.1Sec. ON
Line Queue Accepted	440 Hz, 1 SPLASH
Line Queue Denied	440 Hz, 5 SPLASH
Voice Paging Splash Tone	440 Hz, 2 SPLASH

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Table 2-3 KEY CALLOUT CROSS REFERENCE, EK-616

FUNCTION	616 STANDARD	616 EXECUTIVE DISPLAY
Alarm		ALM
Alternate Point Answer	BREAK	BREAK
Automatic Dialer	DC	DC
Barge-In	BREAK	BREAK
Callback	*	*
Call Monitor	SPK	SPK
Camp-On	*	*
Conference	ADON (DND)	ADON (DND)
Date and Time		CLOCK
Do Not Disturb	ADON (DND)	ADON (DND)
Flash	FLSH (MON)	FLSH (MON)
Hold	HOLD (CORQ)	HOLD (CORQ)
Intercom	ICM	ICM
Intercom Call Forward		
With Follow-Me	RGTR (FWME)	RGTR (FWME)
Last Number Redial	DC	DC
Message Waiting	*	*
Microphone Mute	MIC	MIC
Night Service	RGTR (FWME)	RGTR (FWME)
Room Monitor	FLSH (MON)	FLSH (MON)
Save	DC	DC
Speakerphone	SPK	SPK
Speed Dial	DC	DC
Stopwatch		TIMER
Timer		TIMER

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EK-616

ELECTRONIC KEY TELEPHONE SYSTEM

SECTION 3, SYSTEM CONFIGURATION



1. INTRODUCTION

1.01 The SYSTEM CONFIGURATION Section provides information to help meet the particular equipment needs of the customer. The Option Configuration Worksheets (OCWs) are used to gather specific system and station data for ordering equipment and completing the Program Record Forms (PRFs) in Section 4.

1.02 Key callouts have been revised. Feature descriptions enhanced per engineering input.

2. DESCRIPTION OF COMPONENTS

2.01 The following paragraphs describe the component parts of an EK-616 system: the Key Service Unit (KSU) / Power Supply, and Printed Circuit Boards (PCBs).

KEY SERVICE UNIT / POWER SUPPLY

2.02 The KSU / Power Supply, contained in the same unit, houses the PCBs and provides connector plugs to join two 25-pair cables to the 66M1-50 Connecting Blocks. These blocks are used to cross-connect stations, power failure extension bells, alarm sensors, music source and amplifier for external loud speakers. Six modular jacks are provided for Central Office (CO) connections. The KSU is equipped with a Relay Matrix Shorting PCB (RMSU-A).

2.03 The KSU cabinet for the EK-616 system can accommodate up to 16 stations, six CO lines and six Intercom (ICM) links.

PRINTED CIRCUIT BOARDS

Main Common Control PCB

2.04 The Main Common Control (MCCU-6TA) PCB contains an 8-bit microprocessor for system control and two 4-bit microprocessors that control CO line signaling and data transmission between the main Central Processing Unit (CPU) and stations. In addition, the MCCU-6TA PCB contains circuitry for matrix control, internal tone generators, alarm connections, Background Music, Music-On-Hold and system memory.

CO Line / Key Station Interface PCB

2.05 The CO Line Key Station Interface (3X8U-TA) PCB provides circuitry to connect three common CO lines, and eight key stations, matrix switches for three CO lines and four ICM links, and a voice switch circuit for Handsfree reply on ICM calls.

Matrix Expansion PCB

2.06 A Matrix Expansion (RMXU-6A) PCB is required in addition to another CO line / key station interface when the system has more than three CO lines, requires ICM links 5 and 6, and / or if two stations are required for each line during Power Failure Transfer (PF) operation.

Matrix Shorting PCB

2.07 A Matrix Shorting (RMSU-A) PCB is used in place of the Matrix Expansion PCB when only three CO lines, four ICMs and one PF station for each line are used in the system. This PCB is shipped in the KSU.

Line Circuit Protection PCB

2.08 A Line Circuit Protection (LPTU-6A) PCB is required to provide lightning and surge protection for the tip and ring of each CO line.

Multi-line Conference PCB

2.09 A Multi-line Conference (MLCU-6A) PCB must be installed for external conference. It maintains the audio level when several stations are in conference.

Speakerphone PCB

2.10 The Speakerphone (SPDU-6A) is standard in the Executive Display Key Telephone and optional in the Standard Key Telephone. This PCB provides the key telephone with full speakerphone capabilities, and replaces the Call Monitor (FTDU-6A) PCB equipped in the Standard Key Telephone.

Ground Flash PCB

2.11 The optional Ground Flash (GRDU-6A) PCB is mounted on the MLCU-6A and is used in systems requiring PBX Ground Flash.

3. COLLECTION OF DATA

3.01 Three OCWs are provided in this section to help define a customer's needs. There is a System OCW (Table 3-1), the Permitted Codes OCW (Table 3-2) and Station OCW (Table 3-3). When completed, these worksheets will provide sufficient information to order the required hardware and to complete the Program Record Form in Section 4 of this manual.

SYSTEM OPTIONS

3.02 The following paragraphs provide instructions for completing the System OCW (Table 3-1).

Outside Lines - Item 1

3.03 The EK-616 system can accommodate six outside lines. Outside lines include common, Wide Area Telephone Service (WATS), Foreign Exchange (FX), Private and other specialized services. Indicate how many outside lines are needed (1-6).

Stations - Item 2

3.04 Up to 16 stations can be installed. Stations include: Standard Key Telephones, Executive Display Key Telephones, Door Chime Boxes and Monitor Boxes. After completing Table 3-3, indicate the total number of stations required.

CO Line Signaling - Item 3

3.05 The system can send either tone or pulse signaling on each CO line. Indicate the type of telephone service (TONE/PULSE) required for each line.

PBX Lines - Item 4

3.06 When a system is installed behind a Private Branch Exchange (PBX) trunk access codes may be required for a station user to access an outside line. Indicate which lines (1-6) will be installed behind a PBX.

Flash - Item 5

3.07 When the FLSH (MON) key is pressed, an open loop or ground Flash signal is sent by the line circuit. Indicate type of flash required (OPEN LOOP/GROUND) for each line.

Queue Groups - Item 6

3.08 Similar lines (i.e. Common CO, WATS, FX etc.) can be organized into groups (up to six). These groups allow a station user to queue (wait in line) for an available outside line in a busy line queue group. Indicate how many queue groups are desired and which lines should be arranged into each group.

Special Line Access - Item 7

3.09 An individual station user or limited number of station users may have exclusive use of a certain line. Limited access to these lines may be desired for all station users. Determine which lines, programmed for private use by a limited number of station users, should permit limited access to all other station users.

External Page Zones - Item 8

3.10 An external page zone requires the installation of ancillary equipment. For each external page zone output, indicate if External Page is required (YES / NO). For each line indicate if the External Page equipment is to receive CO audible signals (YES / NO).

Release of Abandoned Call On Hold - Item 9

3.11 Release of Abandoned Call On Hold returns a line to an idle condition if the party on Hold hangs up. For each line, indicate if Release of Abandoned Call on Hold is required (YES / NO).

Alarm - Item 10

3.12 Alarm signals activated by customer provided equipment can be transmitted to telephones in the system. For each alarm circuit, indicate if such equipment will be installed (YES / NO) and whether the equipment purchased transmits an open or closed circuit alarm indication (OPEN / CLOSED).

Meet-Me-Answer Paging and Meet-Me-Conference - Item 11

3.13 Meet-Me-Answer Paging enables a user to transmit a page to locate a specific person and then establish a private handset-to-handset conversation.

3.14 Meet-Me-Conference enables up to five stations in the same Internal Page Zone to join in a conference that is initiated by a page. Indicate if the Meet-Me-Answer Paging and Meet-Me-Conference features are desired (YES / NO).

Signal Calling or Voice Announce - Item 12

3.15 The system can be programmed to allow one of two methods of Intercom signaling: either the called station will ring (Signal Calling), requiring the party to reply using the handset or the called party will receive voice announcements and can reply handsfree (Voice Announce). If the system is programmed to allow the Handsfree Reply, the caller can also cause the called station to ring. If the system is programmed for Intercom ringing, Handsfree Reply is not available. Indicate the type of ICM signaling desired (SIGNAL CALLING / VOICE ANNOUNCE).

Three Minute Warning Tone - Item 13

3.16 The system can transmit a signal to the telephone loudspeaker every three minutes during an outside line conversation. Indicate if the Three Minute Warning Tone feature is desired (YES / NO).

Power Failure Bell - Item 14

3.17 In the event of a power failure, an external bell rings following the incoming signal. An external bell is only required for Standard Key Telephones. Indicate the number of Power Failure External Bells required for each line.

Background Music - Item 15

3.18 Background Music (BGM) requires an optional external music source and can be broadcast over the speakers in the key telephones. Indicate if BGM is required (YES / NO).

Music-On-Hold - Item 16

3.19 Music-On-Hold (MOH) can use an optional external music source or internal synthesized music. Indicate if MOH is required (YES / NO) and specify the music source (EXTERNAL / INTERNAL).

I-Hold Reminder - Item 17

3.20 When a call is placed on I-Hold and is not retrieved after a programmed period of time, the system automatically signals the station at which the call was placed on I-Hold. This programmed period of time is the I-Hold Reminder Time. Indicate the length of time, in seconds, a call may remain on I-Hold before receiving the reminder signal (maximum: 250 seconds).

Exclusive Hold Recall - Item 18

3.21 If a call placed on Exclusive Hold is not retrieved within a programmed period of time, the system signals the original station. This programmed period of time is the Exclusive Hold Recall Time. Indicate the length of time, in seconds, a call may remain on Exclusive Hold before receiving the recall signal (maximum: 250 Sec.).

Recall / Reminder Signal - Item 19

3.22 If a call placed on I-Hold or Exclusive Hold is not retrieved after the programmed time period, the station at which the call was placed on hold will receive an audible signal. The duration of this signal is the Recall / Reminder Signal time. Indicate the required length of time in seconds (maximum: 250 Sec.).

Ring Inward Time - Item 20

3.23 The Ring Inward Timer determines the length of transfer audible at the receiving station before the call reverts to the station which initiated the transfer. Indicate the required length of time in seconds (maximum: 250 Sec.).

Talkback Time - Item 21

3.24 The Intercom voice switch used for Handsfree Reply is released when an Intercom call continues longer than a programmed period of time. This period of time is the programmed Talkback Time. Indicate the required length of time in seconds (maximum: 250 Sec.). Enter "0" for uninterrupted talkback.

Flashing Timer - Item 22

3.25 When a line is programmed for PBX operation, a signal is sent to the PBX requesting a transfer dial tone whenever the Flash feature is used. Indicate the desired Flash Time (100ms. - 25 seconds).

Pause Behind a PBX - Item 23

3.26 A programmed pause may be inserted between a PBX Access Code and a telephone number in a Speed Dial or Automatic Dialer number. Indicate the desired duration for a pause (100ms. - 25 seconds).

Toll Restriction

3.27 The system can be programmed to prohibit selected stations from placing unauthorized long distance (toll) calls.

3.28 Restricted stations may be programmed to access Permitted Codes. A Permitted Code allows a station to make a call to an area code which is normally inaccessible to telephones within the system, or a 1 + 800 (WATS) number. Decide how many Permitted Codes (up to 16 twenty digit codes) your system is to have and what the codes will be. Enter these codes on the portion of Table 3-2 labeled PERMITTED CODES.

3.29 If the system is installed behind a PBX, PBX Access Codes must be assigned to PBX lines to allow stations to access outside lines. Although the PBX Access Code is usually designated as '9', other codes may be used. Up to four PBX Access Codes, of up to two digits each, may be used. Enter the desired codes on the portion of Table 3-2 labeled PBX ACCESS CODES.

3.30 Restricted stations may be programmed to access Common Unrestricted Codes. Up to 8 Common Unrestricted Codes, of up to four digits each, may be entered into the system to allow all stations to access emergency assistance (911), directory assistance (1411) etc. Determine what the applicable codes are, and enter the desired codes on the portion of Table 3-2 labeled COMMON UNRESTRICTED CODES.

STATION OPTIONS

3.31 The Station OCW (Table 3-3) is used to assign the features and type of station instrument to each station. Stations are listed by station number, in ascending order, in the left-most column of the table. The following paragraphs provide instructions for completing the Station OCW.

Name of Station User - Column 1

3.32 Enter the name of the station user next to the corresponding station number.

Type of Station Instrument - Column 2

3.33 Indicate the type of station instrument and if it is to be wall mounted (W). Station instruments include Standard Key Telephones, Executive Display Key Telephones, Door Chime Boxes and Monitor Boxes.



Line Access - Column 3

3.34 Check those lines which should be accessed by a particular station.

CO Audible - Column 4

3.35 Check those lines which should ring at a particular station.

NOTE: Make sure that stations have full or limited access to the selected lines.

CO Audible Disable, Station - Column 5

3.36 Incoming CO ringing is blocked when the RGTR (FWME) key is pressed while the handset is off hook and the telephone is idle.

Night Service, Preset - Column 6

3.37 Check those stations designated for Night Service, Preset.

NOTE: Be sure that stations have full or limited access to all lines.

Do Not Disturb - Column 7

3.38 If programmed, stations can block all incoming CO and ICM calls. Check stations that should have this feature.

Executive Call Forward - Column 8

3.39 Fifteen pairs of stations (executive, executive partner) can be set up so that calls to one of the stations in a pair will automatically be forwarded to the other station in the same pair. If the station is an executive station and is to have this feature, enter the number of the other station in the pair. More than one executive can be programmed to one partner. Executive must be programmed for DND.

Off Hook Tone Signaling - Column 9

3.40 Off Hook Tone Signaling can be provided for incoming CO or ICM calls when the station is off hook on another call. Check stations that should have this feature.

Barge-In - Column 10

3.41 If programmed, stations can intrude upon conversations in progress. Indicate the Barge-In level required for each station (0-3).

Level 0

(a) Stations without Barge-In

Level 1

- (a) Station users can directly intrude upon a CO line call, causing a three-way conversation.
- (b) Intercom calls in the handset to handset mode can also be directly intruded upon.

Level 2

(a) Intercom calls in the handset to handset mode can be directly intruded upon.

Level 3

(a) Station users can only intrude upon handset to handset ICM calls with a tone signal.

Door Chime Station - Column 11

3.42 Stations can receive door chime tones. Check stations that should have this feature.

Internal Page Zone - Column 12

3.43 Indicate the internal paging zone for each station (81, 82, or 83).

Alarm - Column 13

3.44 Check stations that should receive alarm signals.

Toll Restriction (Class Of Service) - Column 14

3.45 Dialing restrictions can be placed on a particular station. Indicate the Class of Service required for each station.

- 0 = No dial restrictions
- 1 = No dial restrictions
- 2 = Can dial permitted codes or common unrestricted codes.
- 3 = Can dial permitted codes, local 7-digit numbers and common unrestricted codes.
- 4 = Can dial permitted codes, local 7-digit numbers, "1" + 7-digit toll numbers and common unrestricted codes.
- 5 = Can dial local 7-digit numbers, "1" + 7-digit toll numbers and common unrestricted codes.
- 6 = Can dial local 7-digit numbers and common unrestricted codes.
- 7 = Can dial common unrestricted codes.
- 8 = Can dial ICM calls.

4. ORDER REQUIREMENTS

4.01 Use the following guide to determine overall equipment requirements for installation (Figure 3-1). Complete Table 3-4 using the OCWs (Tables 3-1, 3-2, and 3-3).

(a) For each CO line installed in a system the telephone company installs an RJ11C modular jack not more than 25 feet from the KSU. To connect each RJ11C modular jack to the KSU a 4-wire modular line cord is used.

Determine how many 4-wire modular line cords are needed for connecting the RJ11C modular jacks to the KSU. (Refer to Table 3-1, item 1, for the number of lines to be installed in the system.) These must be ordered separately.

(b) 66M1-50 connecting blocks are used for station and miscellaneous connections.

One connecting block (B1) is used to cross-connect:

- 1. Stations with ICM numbers 10-17 (refer to Table 3-1, item 2 for the number of stations to be installed in the system).
- 2. Power Failure External Bells for lines 1-3 (refer to Table 3-1, item 14).
- 3. One alarm sensor (refer to Table 3-1, item 10).
- 4. One paging amplifier (refer to Table 3-1, item 8).
- 5. BGM source (refer to Table 3-1, item 15).
- 6. MOH external source (refer to Table 3-1, item 16).
- 7. Door facility control contact.

A second connecting block (B2) is used to cross-connect:

1. Stations with ICM numbers 18-25.
2. Power failure bells for lines 4-6.
3. A second alarm sensor.
4. A second paging amplifier.
5. Energy Control System (ECS).

Determine if one or two 66M1-50 connecting blocks are needed.

(c) 25 pair cable with a 50 pin female connector on one end joins the KSU to the 66M1-50 blocks. The female connector is inserted into a 50 pin male plug on the KSU; the other end of the cable is wired to the 66M1-50 block.

(d) A 625A4 or 625F4 modular station jack is used to connect each:

1. Standard Key Telephone (refer to Table 3-4).
2. Executive Display Key Telephone (refer to Table 3-4).
3. Monitor Box (refer to Table 3-4).

Determine how many 625A4 or 625F4 modular station jacks are needed.

(e) An AC line surge protector is recommended to protect the PSU, and a 14 AWG insulated copper wire is required to ground the KSU.

(f) Two pair twisted station cable is used to connect the 66M1-50 blocks to:

1. Each modular station jack.
2. Power failure bells.
3. Alarm sensors.
4. Door Chime Boxes (Table 3-4).
5. Paging amplifiers.
6. BGM.
7. MOH external source.
8. ECS.

The standard telephony color code for two pair twisted inside wire is as follows:

Pair #1	WHT-BLU
	BLU-WHT
Pair #2	WHT-ORN
	ORN-WHT

NOTE: Color code may vary depending on wire manufacturer.

Determine how much station cable is needed.

(g) Mounting hardware depends on the installation site, standard practices and national or local codes.

(h) Determine the location of the dedicated AC line. Be sure that this line will be available at the time of system installation.

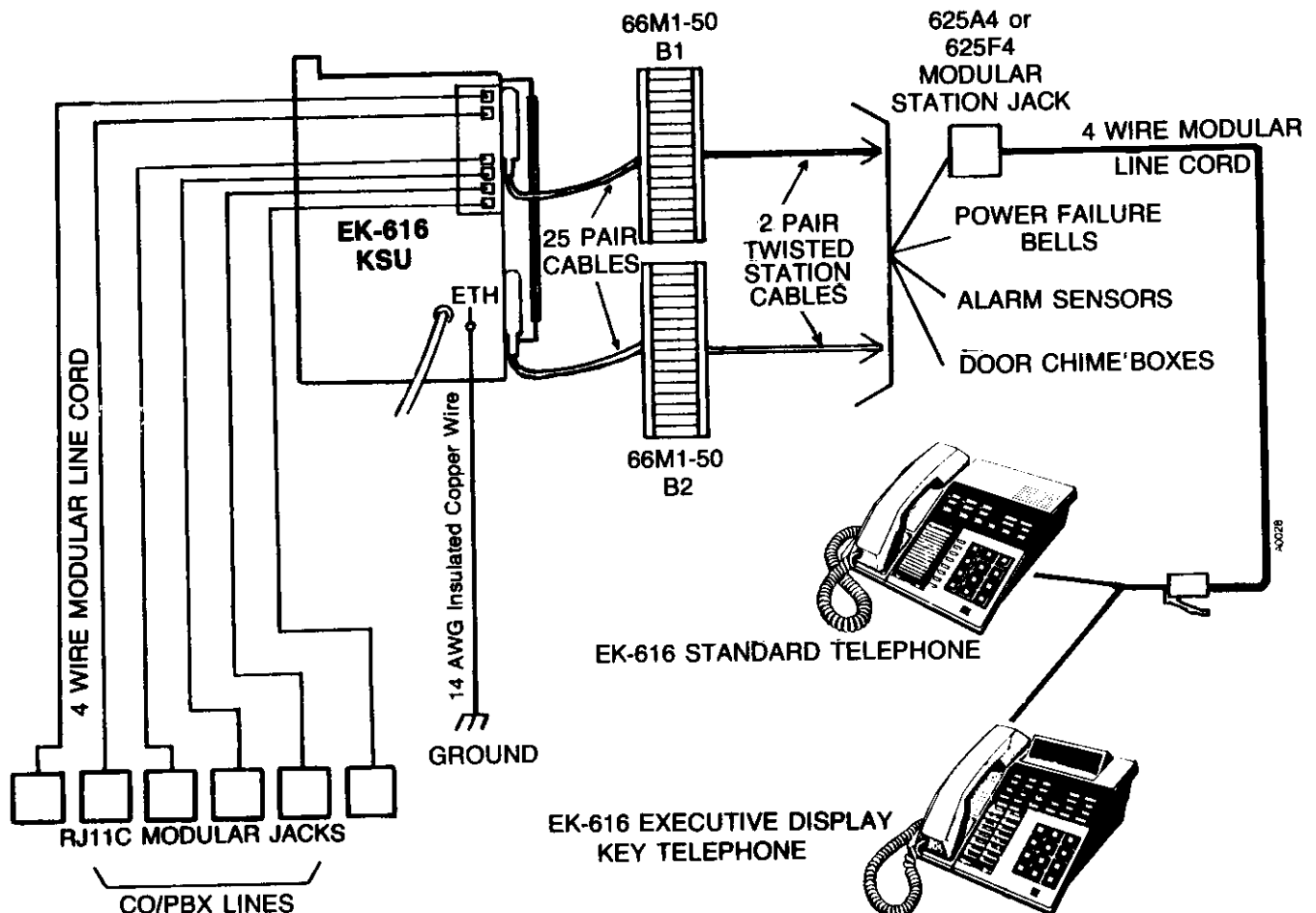


Figure 3-1 STATION EQUIPMENT, EK-616

Table 3-1 SYSTEM OPTION CONFIGURATION WORKSHEET, EK-616

1. Outside Lines (max. 6)	_____																																																																																																																																																																																										
2. Stations (max. 16)	_____																																																																																																																																																																																										
3. CO Line Signaling 4. PBX Lines 5. Flash 6. Queue Groups	<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="6">LINES</th> </tr> <tr> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>	LINES						1	2	3	4	5	6																																																																																																																																																																														
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Group #1 Group #2 Group #3 Group #4 Group #5 Group #6																																																																																																																																																																																											
7. Special Line Access																																																																																																																																																																																											
8. External Page Zones Output #1 Output #2																																																																																																																																																																																											
9. Release of Abandoned Call on Hold																																																																																																																																																																																											
10. Alarm	1. _____ 2. _____																																																																																																																																																																																										
11. Meet-Me-Answer Paging and Meet-Me-Conference	_____																																																																																																																																																																																										
12. Signal Calling or Voice Announce	_____																																																																																																																																																																																										
13. Three Minute Warning Tone	_____																																																																																																																																																																																										
14. Power Failure Bells	<table border="1" style="display: inline-table;"> <tr> <td style="width: 20px; height: 20px;"> </td> <td style="width: 20px; height: 20px;"> </td> <td style="width: 20px; height: 20px;"> </td> <td style="width: 20px; height: 20px;"> </td> <td style="width: 20px; height: 20px;"> </td> <td style="width: 20px; height: 20px;"> </td> <td style="width: 20px; height: 20px;"> </td> <td style="width: 20px; height: 20px;"> </td> </tr> </table>																																																																																																																																																																																										
15. Background Music	_____																																																																																																																																																																																										
16. Music-On-Hold	_____																																																																																																																																																																																										
17. i-Hold Reminder Time	_____																																																																																																																																																																																										
18. Exclusive Hold Recall Time	_____																																																																																																																																																																																										
19. Recall Reminder Signal	_____																																																																																																																																																																																										
20. Ring Inward Time	_____																																																																																																																																																																																										
21. Talkback Time	_____																																																																																																																																																																																										
22. Flashing Timer	_____																																																																																																																																																																																										
23. Pause Behind a PBX	_____																																																																																																																																																																																										

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Table 3-2 PERMITTED CODES OCW, EK-616

Permitted Codes																				
	DIGITS																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1																				
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				
11																				
12																				
13																				
14																				
15																				
16																				
PBX Access Codes																				
1																				
2																				
3																				
4																				
Common Unrestricted Codes																				
1																				
2																				
3																				
4																				
5																				
6																				
7																				
8																				



Table 3-3 STATION OPTION CONFIGURATION WORKSHEET, EK-616

Stations	Name of Station User	Type of Sta. Instrument	Line Access						CO Audible						CO Aud Disable	Night Service	Do Not Disturb	Exec Call Forward	Off Hook Signaling	Barge-In (0-3)	Door Chime	Int Page Zone	Alarm	COS (0-8)		
			1	2	3	4	5	6	1	2	3	4	5	6	5	6	7	8	9	10	11	12	13	14		
Station 10	1	2																								
Station 11																										
Station 12																										
Station 13																										
Station 14			0	0	0	1	1	0	0	0	0	0	0	1												
Station 15																										
Station 16																										
Station 17																										
Station 18																										
Station 19																										
Station 20																										
Station 21																										
Station 22																										
Station 23																										
Station 24																										
Station 25																										

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Table 3-4 SYSTEM HARDWARE CONFIGURATION WORKSHEET, EK-616

ITEM	PART NUMBER	DESCRIPTION	COMMENTS	NUMBER TO ORDER
CABINETS				
EK-616 KSU	61600	Key Service Unit / Power Supply with Relay Matrix Shorting (RMSU) PCB	1	1
PRINTED CIRCUIT BOARDS				
MCCU-6TA	61610	Main Common Control	1	1
RBTU-A	61670	RAM Battery Unit	1	1
3X8U-TA	61620	CO Line / Key Station Interface 3 CO lines / 8 Stations, one ICM HF reply circuit	1-2	—
RMXU-6A	61625	Matrix Expansion CO lines 4-6, ICM links 5 & 6 and 2nd PF station per line (optional)	1	—
LPTU-6A	61605	Line Circuit Protection with Fuses	1	1
MLCU-6TA	61630	Multi-Line Conference	1	1
SPDU-6A	61640	Speakerphone (optional)	as required	—
GRDU-6A	61635	Ground Flash (optional)	1	—
STATION EQUIPMENT				
EK-616	61650	Standard Key Telephone	maximum	—
EK-616 PFT	61655	Executive Display Key with Speakerphone and Power Fail (Tone)	16	—
EK-616 PFP	61656	Executive Display Key Telephone with Speakerphone and Power Fail (Pulse)	one Executive Display Key Telephone required for programming	—
OPTIONAL EQUIPMENT				
	61665	Monitor Box	as required	—
	61660	Door Chime Box	as required	—
	61653	Wall Mounting Kit (STANDARD)	as required	—
	61654	Wall Mounting Kit (EXEC TEL)	as required	—

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