

DATA AUXILIARY SET 801C-L1/2

DESCRIPTION AND OPERATION

CONTENTS	PAGE
1. GENERAL	1
2. PHYSICAL DESCRIPTION	1
3. FUNCTIONAL DESCRIPTION	3
4. OPERATION	7
5. REFERENCES	7

1. GENERAL

1.01 This section contains the physical and functional description and operating procedures for data auxiliary set (DAS) 801C-L1/2. More detailed information pertaining to DAS 801C-L1/2 is contained in Section 598-012-152.

1.02 When this section is reissued, the reasons for reissue will be listed in this paragraph.

1.03 DAS 801C-L1/2 (Fig. 1) provides automatic calling capabilities to a data station and is sometimes referred to in this section as an ACU (automatic calling unit). DAS 801C-L1/2 operates on lines arranged for Touch-Tone® signaling and supersedes all earlier models of DAS 801C.

1.04 The following is a technical specification summary for DAS 801C-L1/2:

Operation: Touch-Tone operation only

Interface Voltages: Per EIA RS-366

Customer Interface Connector: 25-pin
KS-19087-L6

Line Requirements: 2-wire switched
network

Temperature Range: +40 to +120°F

Relative Humidity Range: 20 to 95%.

2. PHYSICAL DESCRIPTION

2.01 List code designations have been assigned to DAS 801C as follows:

- DAS 801C-L1: Printed circuit pack assembly shown in Fig. 2.
- DAS 801C-L2: Housing assembly, front and rear covers, interface assembly, power cord and transformer, and M13G data set interface cord. This equipment is coded as the 52A1 data mounting to simplify ordering when needed for field conversion of DAS 801C-L1 to DAS 801C-L1/2.

DAS 801C-L1

2.02 DAS 801C-L1 consists of two printed circuit boards interconnected by flexible cables. The overall dimensions of the circuit board assembly are 5.55 inches wide, 10.4 inches long, and 1.5 inches high. The assembly weighs approximately 1.6 pounds. The assembly has a faceplate on which are mounted the status indicators and test switches.

2.03 The status indicators are light emitting diodes (LEDs) which monitor four of the interface leads. When the ACU is installed in the housing with the covers installed, the LEDs illuminate "dropout" graphics on the front cover. "Dropout" graphics provide for the appearance of the 2-letter abbreviation when the indicator is lighted and a continuous black opaque surface when the indicator is off.

2.04 The indicators are described as follows:

- ON: Lighted when the power indication (PWI) lead is on
- PD: Lighted when the present next digit (PND) lead is on
- CR: Lighted when the call request (CRQ) lead is on

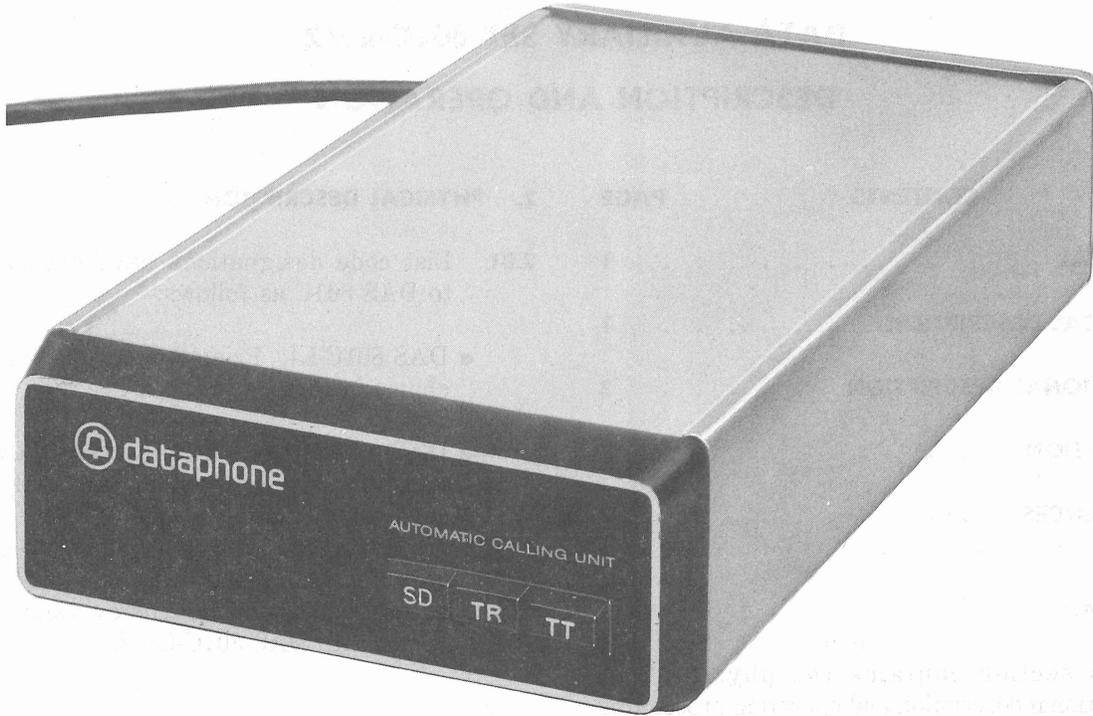


Fig. 1—Front View of DAS 801C-L1/2

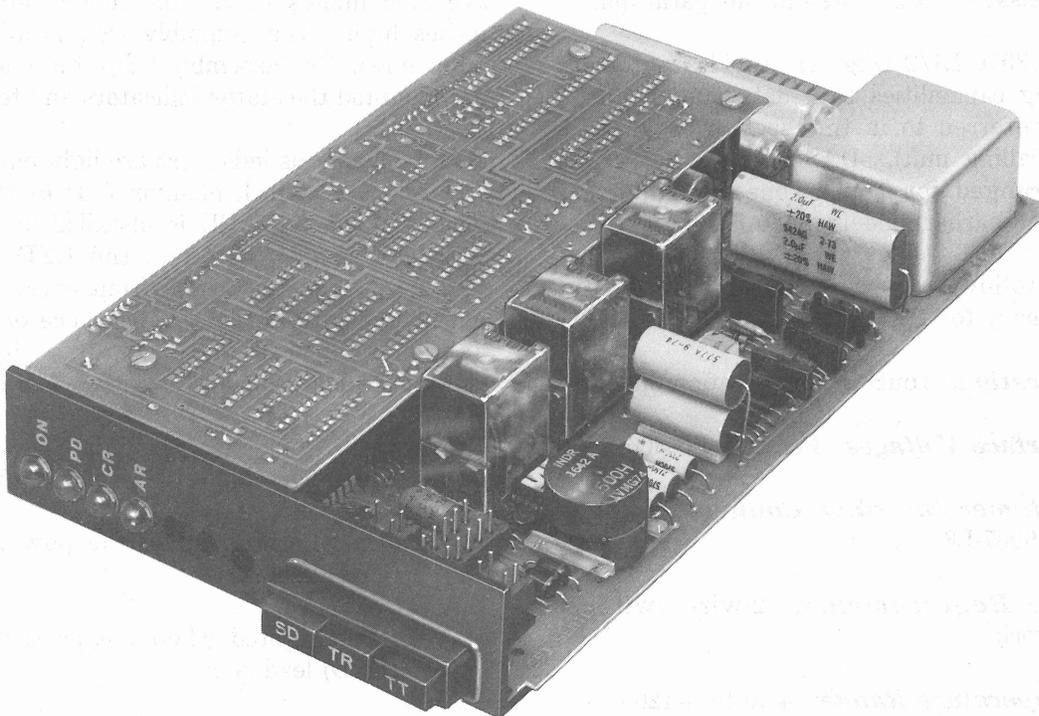


Fig. 2—DAS 801C-L1

- AR: Lighted when the abandon call and retry (ACR) lead is on.

Refer to Section 598-012-152 for a more detailed discussion on the purpose of these indicators.

2.05 The ACU is provided with three nonlocking pushbutton switches on the faceplate which are used to test the ACU. The buttons are designated TT (test transmit circuits), TR (test receive circuits), and SD (slow dialing). The function of these buttons is described in Part 3.

2.06 Installer options are accomplished by setting the position of individual switches on multiple section rocker assemblies (Fig. 3). In addition two jumper plugs on circuit module CM1 are used for option selection. Refer to Section 598-012-202 for instructions on installing and removing options.

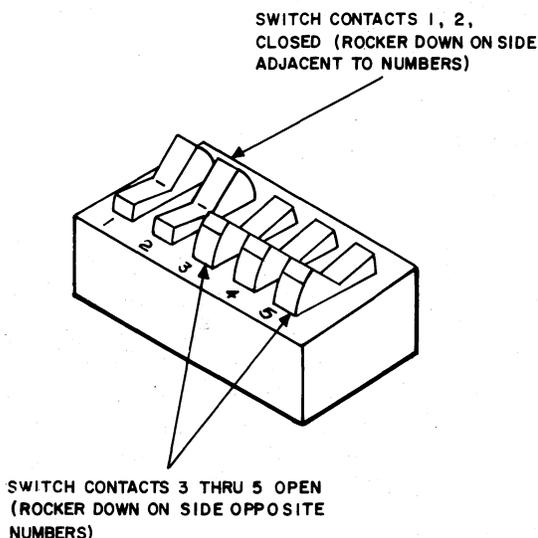


Fig. 3—Details of Option Switch

DAS 801C-L2

2.07 The housing provided as part of list 2 is extruded aluminum with a brushed finish and front and rear black plastic covers. The circuit board assembly plugs into an interface assembly (Fig. 4) which mounts in the rear of the housing.

2.08 The housing with ACU card installed measures 5.8 inches wide, 10.9 inches long, and 2.2

inches high, and weighs approximately 5-1/2 pounds. The transformer weighs approximately 1 pound.

2.09 The interface assembly has two interface connectors which are accessible through the rear cover. One connector is a KS-19087-L6 and provides an interface between the ACU and the customer-provided equipment (CPE). The CPE must be equipped with a cable terminated in a Cinch or Cannon DB-19604-432 plug wired in accordance with Table A. The interface to the telephone equipment is a KS-19088-L22 designed for the M13G cord which is provided with the ACU. Connections to the power transformer are made through the 4-conductor cord which is attached to the interface assembly.

2.10 Power to the ACU is provided by a KS-21239-L4 transformer which plugs directly into a 117-Vac 3-wire grounded outlet. This transformer provides 24 Vac center tapped and a ground on four screw terminals. The ACU consumes approximately 8 watts of power.

2.11 DAS 801C-L1/2 can be equipped with a 107A loudspeaker for call progress tone supervision and for use during tests. This speaker is silent at all times except during call setup. Refer to Section 598-012-202 for connection information for the 107A loudspeaker.

3. FUNCTIONAL DESCRIPTION

3.01 This part contains information pertaining to ACU call origination, test modes, interface leads, and options. Refer to Section 598-012-152 for a detailed functional description of the ACU.

A. Call Origination

3.02 To originate a call, the CPE signals the ACU via lead CRQ (call request). The ACU operates on either ground start or loop start lines (with proper options installed).

- (a) **Ground Start:** The ACU signals the central office (CO) by grounding the ring lead of the telephone line. The CO, which has to be provided with the appropriate ground start circuits, responds by grounding the tip as a go-ahead signal. The tip monitor of the ACU detects this ground and signals the CPE by use of the PND (present next digit) lead.

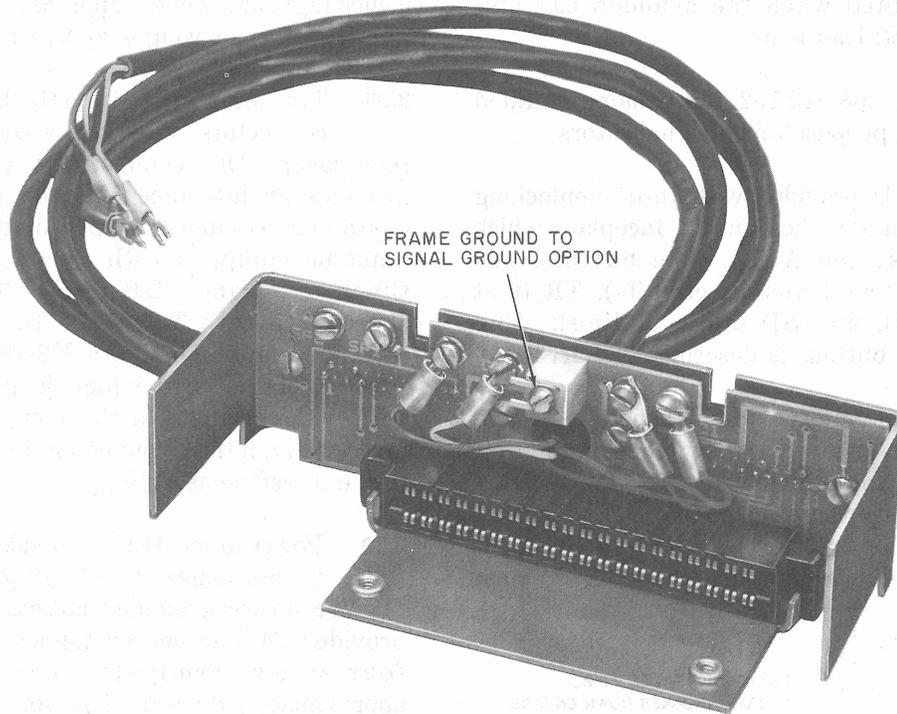


Fig. 4—Interface Assembly

(b) **Loop Start:** The ACU signals the CO by going off-hook. The CO returns dial tone as an indication that dialing may commence. The dial tone is detected by the ACU, which then signals the CPE by use of the PND lead.

3.03 The CPE now proceeds to give the ACU, digit by digit, the telephone number to be dialed, each time indicating on the DPR (digit present) lead that the coding of the four digit signal leads (NB1, NB2, NB4, and NB8) is completed. For each digit received from the CPE, the ACU transmits the appropriate Touch-Tone combination of frequencies to the line. The PND lead is turned off after each combination of tones is transmitted and is turned on again to request the next digit.

3.04 When dialing has been completed and the telephone connection has been established, the data set at the distant end transmits an answer tone to the local ACU. This answer tone is detected either by the ACU, or optionally by the data set. Following this detection, the two connected data sets can communicate with each other.

3.05 A second dial tone detection feature is available with DAS 801C-L1/2 (loop start operation only for both first and second dial tone). If the ACU is used on a circuit where a second dial tone will be encountered, the CPE must present a binary coded digit 13 on leads NB1-NB8 after the first dial tone is detected and after the access code is dialed. When the DPR lead turns on, this instructs the ACU to revert to the dial tone detection mode.

3.06 The status indicators available on the ACU can also be used to observe call progress. When the CPE initiates a call, the CR indicator lights. As soon as the ACU goes off-hook, receives and detects dial tone, the PD indicator lights. During the subsequent dialing of each individual digit, the PD indicator will blink off momentarily. Thus, in a typical DDD call, PD will blink off and on 10 times in rapid succession over a period of about 1 second. While this is too fast to count digits by visual check, deviation from the normal rhythm may be observed.

3.07 At the end of the digit out-pulsing, the CR and PD indicators remain lighted during the

TABLE A

INTERFACE WITH CUSTOMER-PROVIDED EQUIPMENT

TERM.	LEAD	EIA LEAD DESIG	SIGNAL PRESENTED TO CPE OR ACU	FUNCTION
	Frame Ground	AA	Ground	Ground (Note 1)
2	Digit Present	DPR	ACU	Controls when ACU may read signals presented on digit signal circuits
3	Abandon Call and Retry	ACR	CPE	Indication to abandon call and retry at a later time
4	Call Request	CRQ	ACU	To request ACU to originate a call
5	Present Next Digit	PND	CPE	Controls presentation of digits on digit signal circuits
6	Power Indication	PWI	CPE	Indicates if power is available in ACU
7	Signal Ground	AB	Ground	Common ground reference for all circuits except AA
9	Reserved for Testing (+ Power)			+ Power for testing
10	Reserved for Testing (- Power)			- Power for testing
13	Call Origination Status	COS (Note 2)	CPE	Indicates status of automatic call origination procedures
14	Digit Signal Circuit - Low Order Bit	Number Bit NB1	ACU	Parallel binary signals (eg, digits of the called number) are presented to the ACU
15	Digit Signal Circuit - Second Order Bit	Number Bit NB2	ACU	
16	Digit Signal Circuit - Third Order Bit	Number Bit NB4	ACU	
17	Digit Signal Circuit - High Order Bit	Number Bit NB8	ACU	
22	Data Line Occupied	DLO	CPE	Indicates if tel line is in use

Note 1: If Frame Ground is required, connect to ground at transformer.

Note 2: Previously called Data Set Status (DSS).

SECTION 598-012-102

call setup, during ringing and answering, and during the transmission of answer tone. Following recognition of answer tone, the DATA lamp on the associated data set or tel set lights when the data set enters the data mode.

3.08 While the data set is in the data mode, the PD indicator remains lighted for the duration of the call. The CR indicator remains lighted if option Z (terminate call via CRQ after DSS on) is installed, because the CPE keeps the CRQ lead on until the end of the call. If option G (terminate call via data set after DSS on) is installed, the CPE may turn off the CRQ lead (and cause the CR indicator to go off) at any time during the call.

3.09 If option H (ACR timer not stopped) is installed in the ACU, the AR indicator lights a specific number of seconds after going off-hook or after a digit is dialed (time is determined by and is equal to the ACR timer option installed). If option R (ACR timer stopped when DSS is turned on) is installed, the AR indicator lights as explained unless the associated data set enters the data mode or talk mode before the end of the ACR timer interval.

B. Test Modes

3.10 DAS 801C-L1/2 is provided with built-in test features which can be used during installation or maintenance. These tests make use of the test buttons and status indicators on the ACU. Procedures and requirements for these tests are contained in Section 598-012-502.

Dial Tone Test

3.11 This test checks that the ACU can initiate a request for dial tone and recognize dial tone from the CO. The test makes use of the TR button and the CR and PD indicators. Operation of the TR button locally turns on the CRQ lead, lights the CR indicator, and initiates a dial tone request to the CO. When dial tone (or ground start) is returned and detected, the PD indicator lights. This indicates that the dial tone detection circuits are operating properly.

ACR Timer Test

3.12 This test checks that the abandon call and retry timer in the ACU is operating properly.

It can also be used to determine which timer interval is installed in the ACU without having to disassemble the ACU. If the ACR timer is to be checked, the TR button is kept operated after the dial tone test (3.11) for an additional period greater than the ACR timer interval (optionally 7, 14, 28, or 56 seconds). The AR indicator will light at the end of this interval as a check that the ACR timer is functioning.

Answer Tone Detection Test

3.13 This test checks that the ACU can recognize answer tone sent from a distant-end data set. The test requires a data set at the distant end or the assistance of the data test center (DTC). The associated tel set is used to dial the distant data set (or DTC). The TR button is pressed immediately upon hearing answer tone in the receiver. The PD and CR indicators light. The AR indicator lights:

- In less than 1 second if the ACU is equipped with beginning of answer tone option
- When answer tone ceases if the ACU is equipped with end of answer tone option.

3.14 When the TR button is released, the CR and AR indicators go off. When the TR button is pressed again, the CR, and AR indicators light immediately.

Out Dialing Sequence Test

3.15 This test checks that the ACU can translate the binary inputs correctly and generate the tones required for all 10 digits. This test uses the TT and SD buttons and the CR and PD indicators.

3.16 This test is done by dialing the central office ringback number. If the loudspeaker is used, it is possible to hear the digits being transmitted when the TT button is depressed. If the digits have been dialed properly, the central office ringback responds with a double beep. By using the SD button, it is possible to slow down the sequence in order to count the number of digits dialed.

Note: If the loudspeaker is not used, the tones can be heard if a 1011-type handset is connected across tip and ring.

C. Interface Leads

3.17 The customer interface is accessible through the 25-pin male connector at the rear of the ACU. The connector pin numbers and the corresponding lead designations are shown in Table A.

3.18 The telephone interface is accessible through the 25-pin female connector at the rear of the ACU. The connector pin numbers and lead designations are shown in Table B.

TABLE B
TELCO INTERFACE

PIN NO.	DESIGNATION
1	SH1
4	SH2
5	3
7	T
8	R
12	SP2
14	C
16	D1
21	DT
22	DR
23	TK
24	SP1
25	GRD

D. Options

3.19 DAS 801C-L1/2 is provided with a number of options. These options are provided by switches as directed in Section 598-012-202. Refer to Table C for a summary of these options.

4. OPERATION

4.01 DAS 801C-L1/2 (in conjunction with a CPE) operates automatically in originating the call, transferring the line to the data set, and terminating the call. Attendant operation is not required. Refer to Part 3 for a description of how the ACU operates.

4.02 For directions on operating the test buttons, refer to Section 598-012-502.

5. REFERENCES

5.01 The following Bell System Practices provide additional information on DAS 801C-L1/2:

SECTION	TITLE
598-012-152	Data Auxiliary Set 801C-L1/2— Supplementary Information
598-012-202	Data Auxiliary Set 801C-L1/2— Installation and Connection
598-012-502	Data Auxiliary Set 801C-L1/2— Test Procedures

5.02 More detailed information on DAS 801C-L1/2 may be obtained from CD- and SD-1D259-01.

TABLE C

EQUIVALENT OPTIONS OF ALL AVAILABLE ACUS

DESCRIPTION		DATA AUXILIARY SETS				
		801C-L1/2	801C1 & 2	801C3 & 4	801A1, 2, 3 & 4	805A5 & 6
	Ground Start (4-Wire) Ground Start (2-Wire) Without Ground Start (Loop Start)	Not Avail. V Y	Not Avail. V Y	ZK V Y	Not Avail. Fac. Wired Not Avail.	Not Avail. Fac. Wired Not Avail.
Options Depend on Data Set Used	Detect End of Answer Tone	W	W Note 1	W Note 2	W Note 3	W Note 5
	Detect Beginning of Answer Tone	X	X	X	X	X
	Detect 2025-Hz Answer Tone	S	S Note 1	S Note 2	S Note 3	S Note 5
	Detect 2225-Hz Answer Tone	T	T	T	T	T
	Data Set to Data Mode by Contact to DT Data Set to Data Mode by Isolated Contact Data Set to Data Mode by Grounded Contact	Q Not Avail. ZG	Q Remove Q Not Avail.	Q F ZG	Q Remove Q Not Avail.	Q F ZG
	Data Set Answer Detection Without End of Number ACU Answer Detection or End of Number	E B	Not Avail. Fac. Wired	E B	Not Avail. Fac. Wired	E B
	Isolated TK Contact Isolated CL Contact Grounded TK and CL Contacts	ZA Not Avail. Use ZP	Fac. Wired Not Avail. Not Avail.	ZA ZC ZB	Fac. Wired Not Avail. Not Avail.	ZA ZC ZB
No Clear Signal, No TK Contact Clear Signal to Data Set	ZN ZP	Not Avail.				
Customer Options	Terminate Call Via Data Set After DSS On (line transfer in test)	G	Remove Z	G	Z	G
	Terminate Call Via Data Set After DSS On (CL contact in test)	G	Not Avail.	ZD	Not Avail.	ZD
	Terminate Call Via CRQ After DSS On (line transfer)	Z	Z	Z	Remove Z	Z
	Termination Call Via CRQ After DSS On (CL contact)	Z	Not Avail.	A	Not Avail.	A
	Stop ACR Timer When DSS Goes On	R	R	R	Y	R
	Do Not Stop ACR Timer When DSS Goes On	H	Remove R	H	Remove Y	H
	7-Second ACR Timing 14-Second ACR Timing 28-Second ACR Timing 56-Second ACR Timing	ZQ ZR ZS ZT	Screwdriver Adjustment			
SG Connected to FG SG Not Connected to FG	ZU ZV	Strap No Strap	Strap No Strap	Strap No Strap	Strap No Strap	
2-Wire 4-Wire	Fac. Wired Not Avail.	Fac. Wired Not Avail.	ZH ZJ	Fac. Wired Not Avail.	Fac. Wired Not Avail.	
DLO Controlled by ACU DLO Controlled by ACU and Data Set	Fac. Wired Not Avail.	Fac. Wired Not Avail.	ZM ZL	Fac. Wired Not Avail.	Fac. Wired Not Avail.	
Contact Interface Voltage Interface	Not Avail. Fac. Wired	Not Avail. Fac. Wired	Not Avail. Fac. Wired	U Note 6 V Note 7	ZE ZF	
Mounting Cord – 13-Conductor Mounting Cord – 10-Conductor Mounting Cord – 14-Conductor	M13G Not Avail. Not Avail.	Not Avail. M N Note 4	Not Avail. M N	Not Avail. K M	Not Avail. M N	

Note 1: Available only in 801C2

Note 2: Available only in 801C4

Note 3: Available only in 801A1 and 2

Note 4: P in early production sets

Note 5: Available only in 801A6

Note 6: Available only in 801A2 and 3

Note 7: Available only in 801A1 and 4