Fax : (0522)-2452581
Telephone: (0522)-2465715
Telegram : 'RAILMANAK', Lucknow
Email : dsetpl@rdso.gmail.com

सत्यमेव जयते

भारत सरकार – रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
लखनऊ – 226011
Government of India - Ministry of Railways
Research, Designs & Standards
Organization, LUCKNOW - 226011

No. EL/3.1.14

Dated: 15.09.11

Chief Electrical Engineers,

1. Central Railway, Mumbai CST- 400 001.
2. Eastern Railway, Fairlie Place, Calcutta- 700 001
3. Northern Railway, Baroda House, New Delhi-110 001
4. Southern Railway, Park Town, Chennai-600 003
5. South Central Railway, Rail Nilayam, Secunderabad –500 071
6. South Eastern Railway,Garden Reach,Calcutta-700 043
7. Western Railway, Churchgate, Mumbai–400 020
8. East Cost Railway, Chandrashekharpur, Bhubaneshwar- 751 016.
9. North Central Railway, Hasting Road, Allahabad-211 001.
10. East Central Railway, Hazipur-844101 (Bihar)
11. South Western Railway, Hubli-580023
12. West Central Railway, Jabalpur-482001
13. South East Central Railway, Bilaspur-495004

Technical Circular No. RDSO/2011/EL/TC/0110 (Rev.0) dated 24-6-11

Sub: Standardization of Circuit diagram for Auto regression through VCD, penalty braking through VCD, schematic wiring diagram of main unit and cab unit, Instruction to the drivers, procedure of testing of VCD in loco shed for conventional tap changer and MPCS fitted electric locomotives.

Ref.: (i) This office letter No. EL/3.1.14 Dated. 10-09-09.
(ii) RDSO specification: RDSO/2008/EL/SPEC/0025/Rev. 5 (March'2010).

Objective: As per Railway Board instructions, specification for Vigilance Control Device for tap changer locomotives has been revised by RDSO and VCDs are being fitted by Railways as per the revised specification. Earlier, Technical Circular No. RDSO/2009/EL/TC/0101(Rev '0'), dated 08.09.2009 was issued by RDSO under the cover of above referred letter. The above TC is applicable to old designs of Vigilance Control Device as per RDSO specification: RDSO/2008/EL/SPEC/0025/Rev. 3 or earlier versions. Now technical circular has been prepared as per revised specification RDSO/2008/EL/SPEC/0025/Rev. 5 (March'2010) which contains following:

- Circuit diagram for Auto regression through VCD-Annexure-I;
- Circuit diagram for penalty braking through VCD-Annexure-II;
- Schematic Wiring Diagram of Main unit and Cab Unit-Annexure-III;
- Instruction to the drivers –Annexure-IV;
- Procedure for Testing of VCD in loco shed –Annexure-V and
- Instructions for fitting VCD in locomotives fitted with MPCS- Annexure-VI.

It is requested to use the Technical Circular. The instructions to the driver as per Annexure-IV may be pasted in Loco cabs and may be given wide spread publicity.

15/09/11
(Sandeep Srivastava)
for Director General (Elect.)

Encl: As above

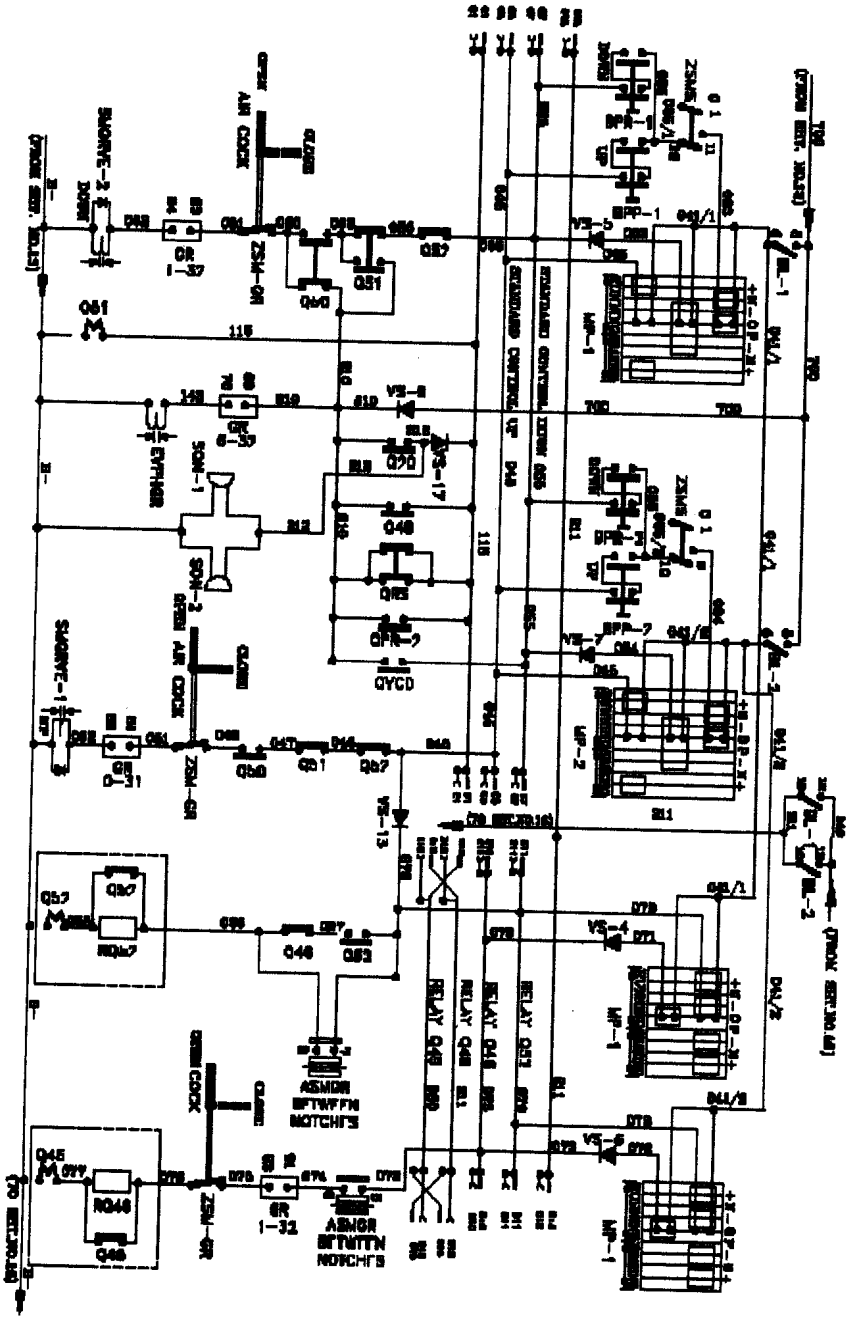
Copy to: 1. Secretary (Electrical traction), Railway Board, Rail Bhawan New Delhi-110001
2. Sr.DEE/TRS/ELSs (As per standard mailing list).

15/09/11
(Sandeep Srivastava)
for Director General (Elect.)

Encl: As above

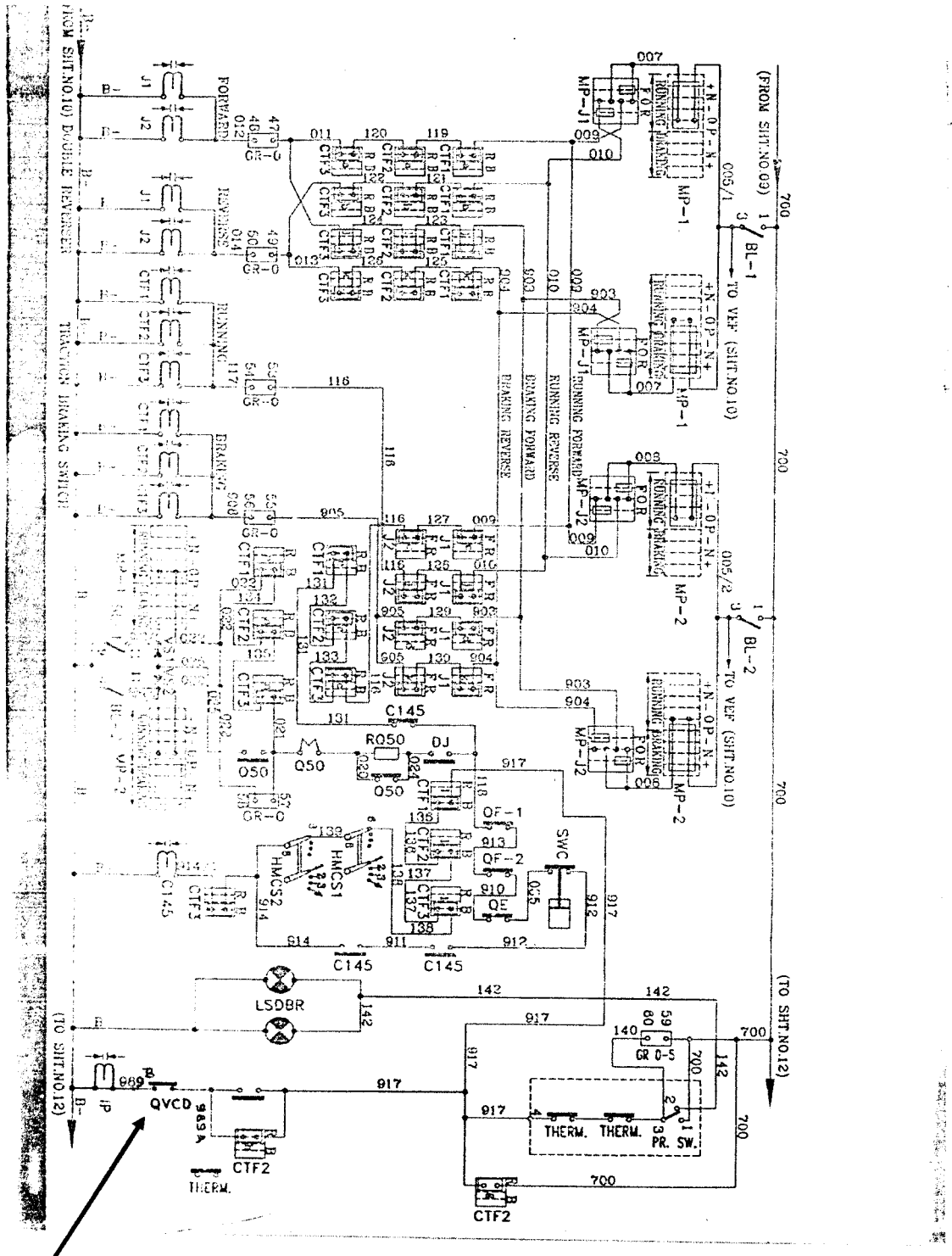
Annexure-I

Auto regression circuit through QVCD in conventional locos

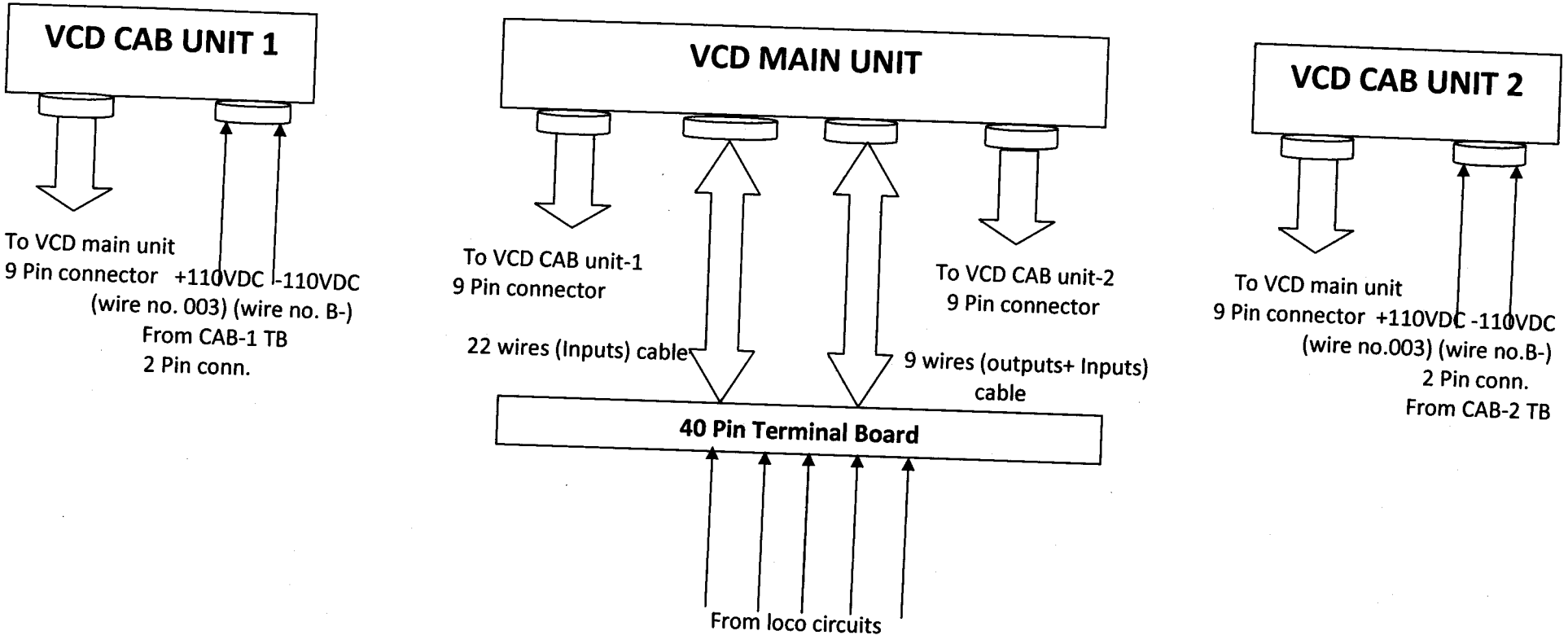


Annexure-II

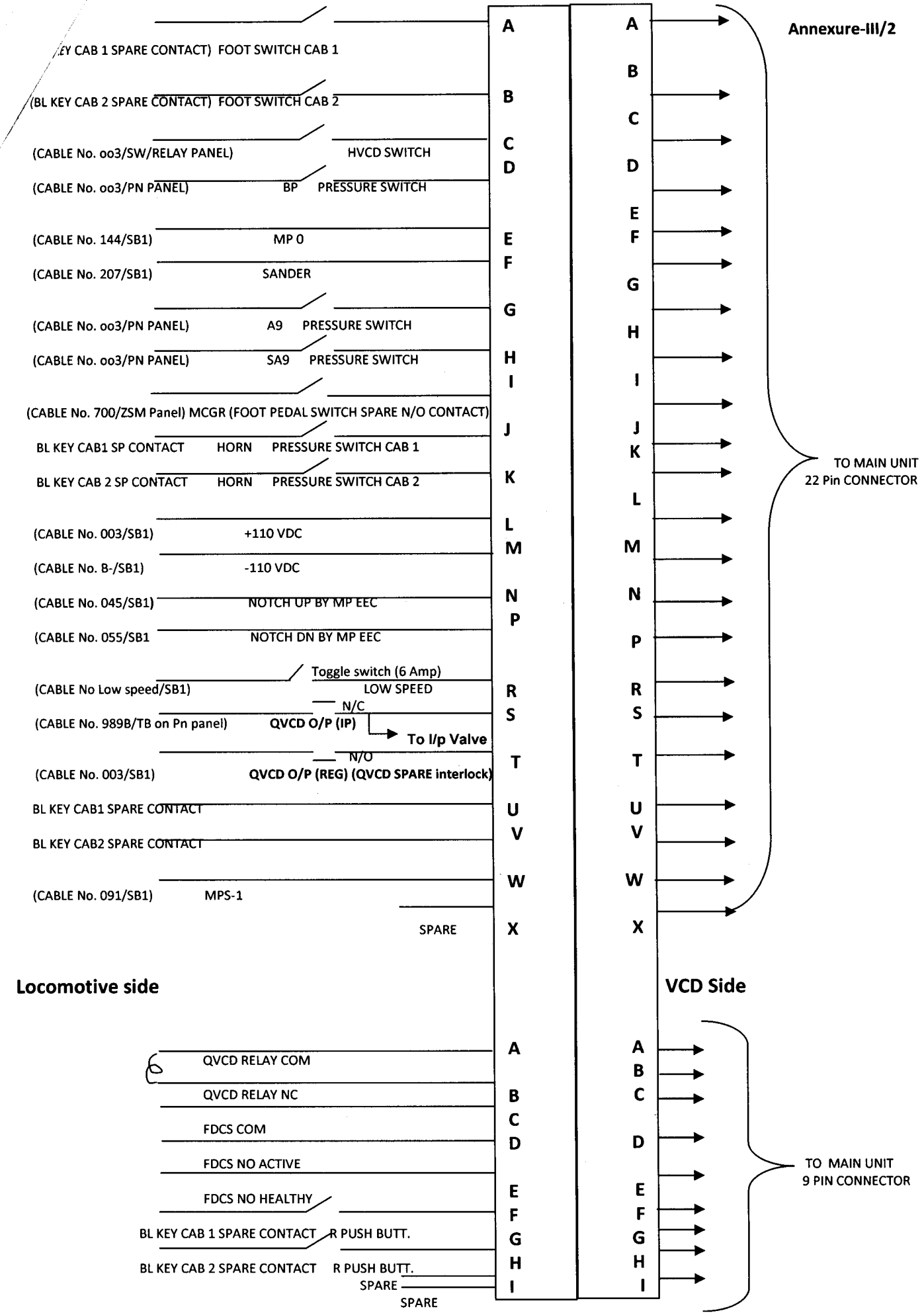
Penalty braking through VCD in conventional locomotives



QVCD N/C contact



General Schematic Diagram of VCD



General Schematic wiring at 40 Pin Terminal Board for conventional locomotive

NOTE: +110 DC supply can be taken either from 003 or 700.

Annexure-IV

VIGILANCE CONTROL DEVICE IS FITTED IN THIS LOCO

INSTRUCTIONS TO DRIVERS

1. Loco Driver should do any of the following operation once in 60 seconds to prove his alertness:

   a) Notch up/Notch down by master controller or EEC;
   b) Brake applications through A9 or SA9;
   c) Operation of HT or LT horn;
   d) Application of sander;
   e) Pressing VCD acknowledgement push button available for assistant Driver;
   f) Pressing of foot switch available for main driverand
   g) Operation of first shunting notch i.e. MPS-1

2. If none of the above operations is done within 60 seconds, a yellow flashing light will glow on VCD display unit provided near asstt driver side to attract the attention of driver. This will continue for 8 seconds. Driver can confirm his alertness by performing any of the action listed above a) to g) with in 8 seconds then flashing of lamp will stop.

3. Even after 8 seconds, if no operation is performed an alarm will sound along with flashing light for another 8 seconds. Driver has to do any of the above operations or press acknowledgement push button available for assistant driver immediately to confirm his alerness.

4. If driver fails to take any action then, VCD will apply penalty brake automatically for 32 seconds and auto regression will take place. During brake application yellow flashing light as well as buzzer sound shall continue. The VCD cannot be reseted and brake will applied for 32 seconds.

5. For releasing the brake, keep MP in zero position and then push the VCD Reset push button available at main driver desk after 32 seconds of brake application.

6. Vigilance acknowledgement Push Button/foot paddle switch should not be pressed for more than 60 seconds continuously.

7. A VCD bypass switch (HVCD) is provided in Switch Board panel. In case of any malfunctioning of VCD, loco pilot can isolate the VCD by keeping the bypass switch in By pass position duly endorsing in the log book. It is to be noted that operation of bypass switch is recorded in the memory of VCD.

8. If BP suddenly drops or first notch regression taken place, check VCD for operation. In case of first notch regression taking place alone without brake application, driver should check condition of IP valve also.

9. VCD will remain in "Sleep mode" when
   - Vehicle is stationary/speed is less than 2 kmph
   - In trailing loco in the MU operation.
   - Application of A-9/SA-9
   - Manual control of GR

10. **Note: 1) Don't close IP valve cock.**
    2) In standing condition, apply SA-9 otherwise VCD may be active in the locomotive where low speed signal is not available from speedometer.

Annexure-V

Functional Testing of VCD in locomotive

VCD functionality in the locomotive shall be checked after final testing of the locomotive is completed. Following operation shall be checked.

1. Energise the locomotive and check that VCD cab unit is active in active cab only. In normal condition only green LED shall glow on VCD cab unit. The VCD system shall get suppressed in following cases:

   - Vehicle is stationary/speed is less than 2 kmph;
   - In trailing loco in the MU operation;
   - Application of A-9/SA-9 and
   - Manual control of GR.

2. Vigilance control device get suppressed when low speed signal from speedometer remains high (110V). Thus speedometer signal available on 40 pin terminal board of VCD shall be disconnected by opening a toggle switch of 6 Amp capacity (as per CLW specification No.CLW/ES/S-27 and may be procured from CLW approved sources) which may be provided near main unit termed as VCD test switch. In this condition no low speed signal is available to VCD. Locomotive shall be energised. Both A-9 & SA-9 brakes shall be released. Vigilance cycle shall start by VCD which can be seen on LCD of main unit. Apply reset functions within one minute one by one and check that VCD is getting reset by performing following functions.

   - Notch up/Notch down by master controller or EEC;
   - Brake applications through A9 or SA9;
   - Operation of HT or LT horn;
   - Application of sander;
   - Pressing VCD acknowledgement push button available for assistant Driver and
   - Pressing of foot switch available for main driver.

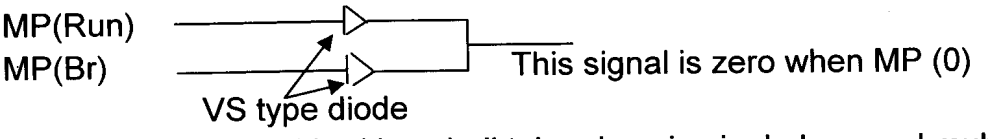
3. After testing reset functions do not do any reset function for one minute, VCD cab unit shall start flashing yellow warning light for a period of 8 +-2 seconds. After 8 seconds, an audible alarm for a period of 8+-2 seconds shall begin in addition to yellow flashing light. If no reset function is performed with this period of 16 (8+8) seconds then after 16 seconds, yellow flashing light along with audible alarm shall continue and penalty brake shall be applied by VCD which shall remain applied for a period of 32+-2 seconds and cannot be reset once applied during this period. After 32 seconds, ensure master controller at zero position and reset the VCD using VCD reset push button provided at main driver desk. The brake application then gets released, the visual warning is cancelled and normal vehicle operation can be re-established.
4. After testing the above, apply brakes through A9/SA9 or take manual notches through GR, VCD shall get suppressed. Close the VCD test switch, VCD shall go in suppression mode and VCD shall not perform the above functions given in para 3 above.
5. Bypass VCD from HVCD bypass switch provided in switch board panel in healthy condition of VCD. Green and red LED shall glow to show healthy and bypass condition.

Annexure-VI

Instructions for fitting Vigilance Control Device in locomotives fitted with MPCS

(i) The connections of QVCD relay contacts in MPCS fitted locomotives shall be as per attached schematics. QVCD N/O contact feedback shall be taken from spare contact of QVCD relay and this feedback shall be connected to Pin T of 22 Pin connector.

(ii) In MPCS fitted locomotives, MP(0) signal is not available from master controller as available in other conventional locomotives. For this signal from MP Braking and MP Run shall be taken through a diodes as follows. Two diodes as per CLW specification No. CLW/ES/SK.1/D-1 ALT.B shall be provided.



Auto-regression and braking shall take place in single loco and multiple operation as per following:

A. Operation of auto-regression (Single loco operation)

1. When QVCD relay gets energise then its N/O contact closes and feed goes to wire no. 113.(Schematic-1)
2. SMGRVE-DN relay pickup and auto-regression comes through feed of wire no. 113 connected directly to MPCS output O-16. Because (GR 1-32) contact is in closed condition. (open only at GR-0).
3. At this time output O-40 will also high through wire no.113 which enables soft logic of Q51 relay for auto-regression.(Schematic-2)

B. Operation of emergency braking: (Single loco operation)

1. When QVCD relay gets energise then its N/C contact gets open and cuts the feed of IP coil through wire no. 189.(Schematic-1)
2. When IP coil de-energised it operates brakes through pneumatic circuit.

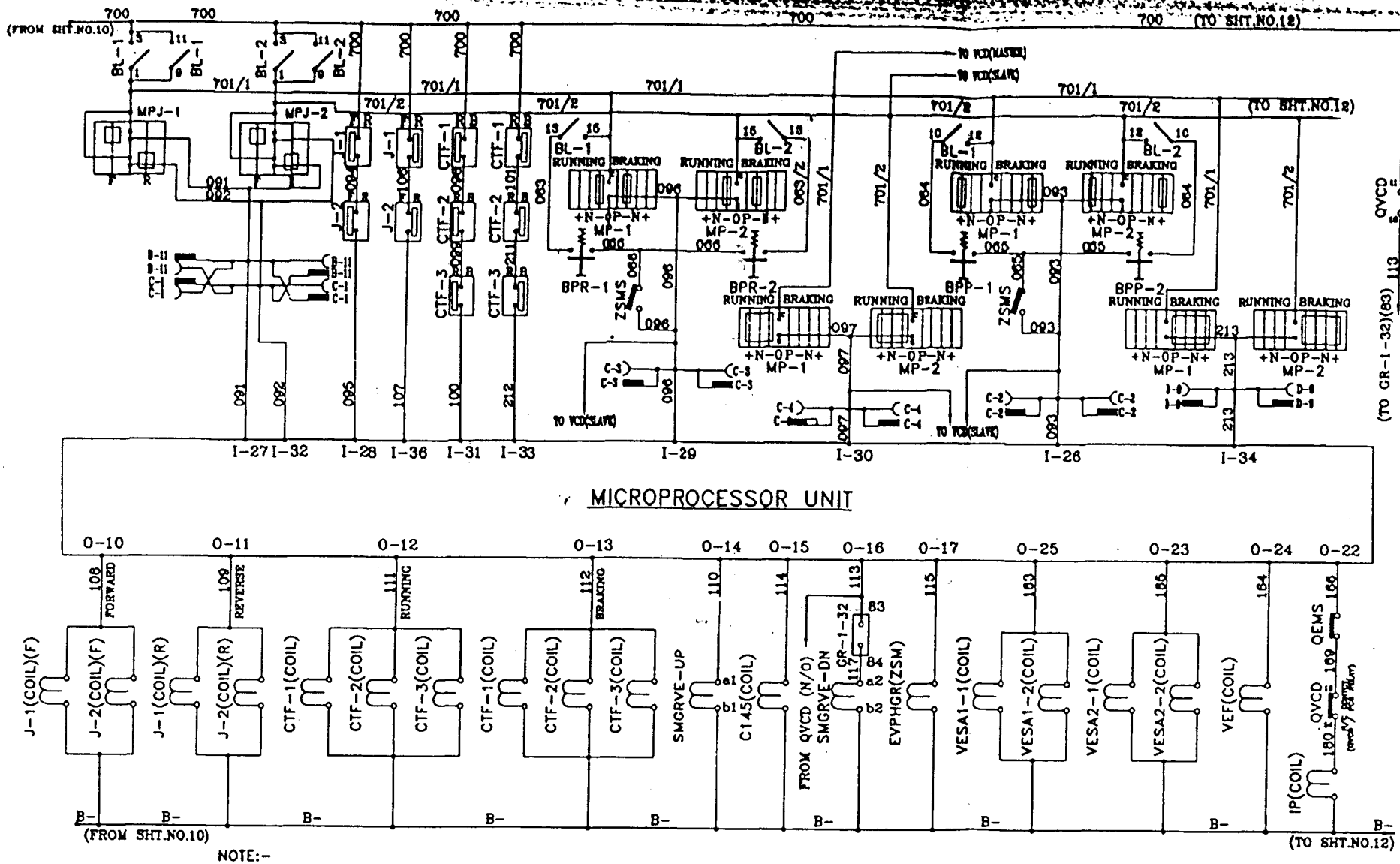
C. Operation of auto-regression (Multiple operation)

1. At the time of auto regression in leading loco, output O-40 (Q51 relay logic) gets high at wire no. 237 of leading loco.(Schematic-2)
2. Then supply goes to wire no. 256 of trailing loco through MU coupler/pin no. D10 (F) & D15 (M) of leading Loco to MU coupler/pin no. D10 (M) & D15 (F) of trailing Loco for operation of auto regression through input I-84.
3. When I-84 input of trailing Loco gets high then MPCS perform logic of soft Q51 relay for auto regression in trailing Loco.
4. When output O-40 of trailing Loco is high, feedback goes to leading loco through wire no 237 and MU coupler/pin no. D10 (F) & D15 (M) of trailing loco to wire no. 256 and MU coupler/pin no. D10 (M) & D15 (F) of leading loco.

5. Now input I-84 of leading loco gets high for feedback/operation from leading loco.

D. Operation of emergency brake: (Multiple loco operation)

1. Emergency brake shall be operated through pneumatic circuit of Leading Loco because VCD in trailing loco shall be in suppression mode.(Schematic-1)

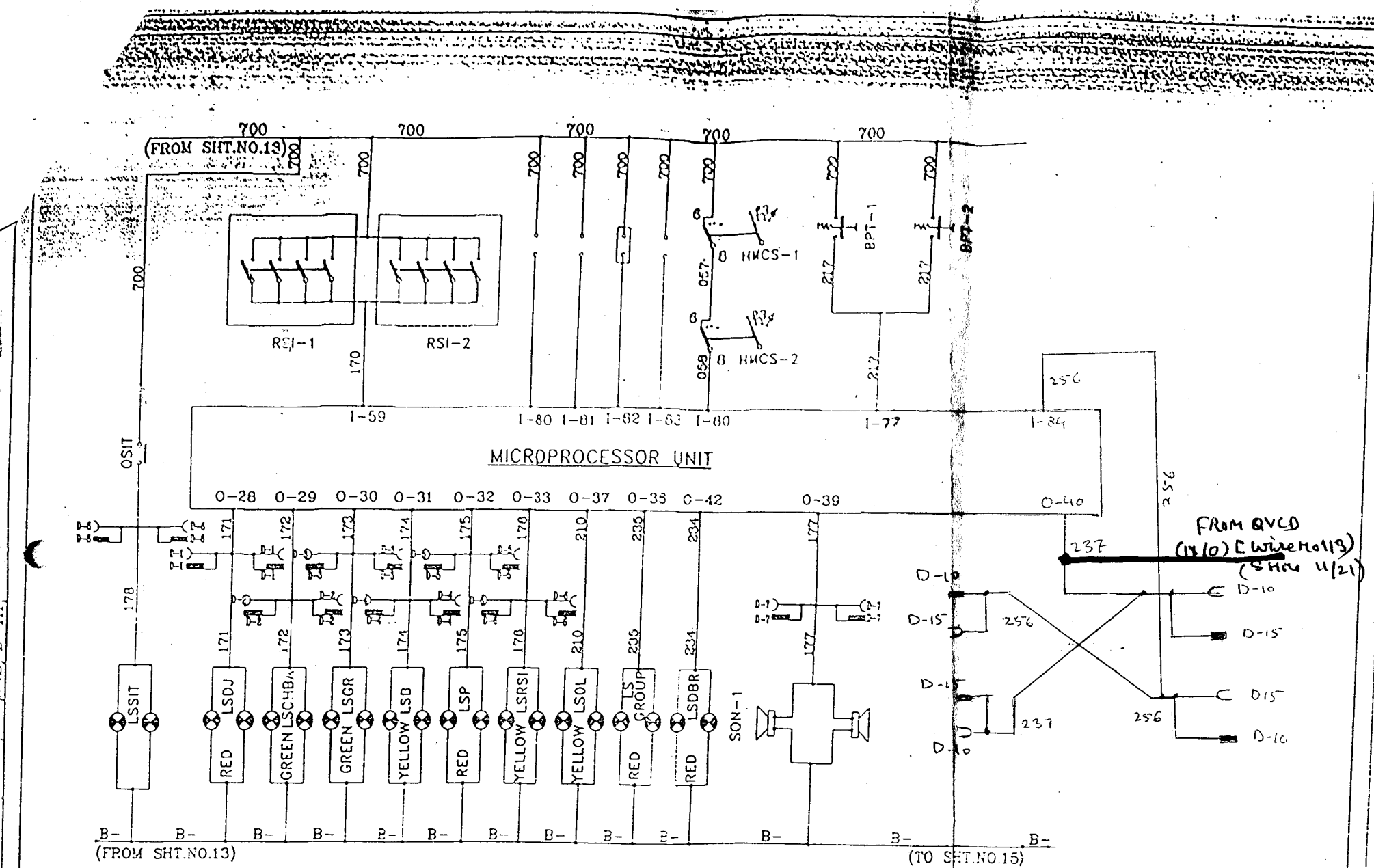


NOTE:-

1. VCD's PC8 RELAY N/C CONTACT ADDED IN IP COIL CKT & N/O CONTACT IN SMGRVE-DN COIL CKT.
2. REFER SHEET NO-20 & 21(VCD SCHEME)

DRAWN / CHECKED / SSE/D / AEE/D-III	WAG-7(MODULAR) (CREW FRIENDLY TYPE) ...TIC CONVERTER WITH ...CPU-REV-2) LOCO	Dy.C.E.E.(D-I)	CHITTARANJAN LOCOMOTIVE WORKS WEST BENGAL, INDIA. DRG.No. CLW.3W.15000.004 Sht.NO. 11 OF 21	SCHEMATIC DIAGRAM FOR TRACTION CONTROL & SANDING CKT. Date:- 21-08-2008

CLW



WAG-7(MODULAR) (CREW FRIENDLY TYPE) STATIC CONVERTER WITH (U-REV-2) LOCO	Dy.C.E.E.(D-I)	CHITTARANJAN LOCOMOTIVE WORKS WEST BENGAL, INDIA. DRG.No. CLW.3W.15000.004 Sht.NO. 14 OF 21	SCHEMATIC DIAGRAM FOR LAMPS,SON CKT. Date:- 21-08-2008

CLW